Undergraduate Catalog

1979-80

West Virginia University Bulletin

COVER—An art student utilizes the beautiful Core Arboretum for painting.

WEST VIRGINIA UNIVERSITY

1979-80 Undergraduate Catalog

1979

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UNIVERSITY CALENDAR, 1979-80

Summer Sessions, 1979

May 21, Monday ..... Registration, First Summer Session
May 22, Tuesday ..... First Classes
May 28, Monday ..... Memorial Day Recess
June 29, Friday ..... Last Classes
June 29, Friday ..... Registration, Second Summer Session
July 2, Monday ..... First Classes
July 4, Wednesday ..... Independence Day Recess
August 10, Friday ..... Last Classes

First Semester, 1979-80

August 23, 24, Thursday and Friday ..... Freshman Orientation
August 24, Friday ..... Registration
August 27, Monday ..... First Classes
September, 3, Monday ..... Labor Day Recess
October 9, Tuesday ..... Faculty Assembly Meeting
October 12, Friday ..... Mid-Semester
October 12, Friday ..... Mid-Semester Reports Due
November 17, Saturday, to
November 25, Sunday, incl. ..... Thanksgiving Recess
December 14, Friday ..... Last Classes
December 17, Monday,
to December 22, Saturday, incl. ..... Final Examinations
December 23, Sunday,
to January 13, Sunday, incl. ..... Christmas Recess

Second Semester, 1979-80

January 11, Friday ..... Registration
January 14, Monday ..... First Classes
February 7, Thursday (not a holiday) ..... West Virginia University Day
February 18, Monday ..... Washington's Birthday Recess
February 29, Friday ..... Mid-Semester
February 29, Friday ..... Mid-Semester Reports Due
March 29, Saturday, to April 6, Sunday, incl. ..... Spring Recess
April 7, Monday ..... Easter Recess
April 8, Tuesday ..... Faculty Assembly Meeting
May 2, Friday ..... Last Classes
May 5, Monday, to May 10, Saturday, incl. ..... Final Examinations
May 12, Monday ..... Grade Reports for all Graduates Due in Dean's Office
May 13, Tuesday ..... Dean's Reports of Graduates Due in Office of Admissions and Records
May 17, Saturday ..... Alumni Day
May 18, Sunday ..... Commencement

The academic year is divided into two semesters of approximately seventeen weeks and summer sessions.

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Charleston, WV 25301

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Morgantown, WV 26506

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Edited by Stanley J. Nels
Associate University Editor

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West Virginia University is an Equal Opportunity-Affirmative Action employer. In compliance with Federal Executive Order No. 11246 as amended, Title VII of the Civil Rights Act, West Virginia Human Rights Act, Title IX (Educational Amendments of 1972), Sections 503 and 504 of the Rehabilitation Act of 1973, and other applicable laws and regulations, the University provides equal opportunity to all prospective and current members of the student body, faculty, and staff on the basis of individual qualifications and merit without regard to race, sex, religion, age, national origin, or handicap, as identified and defined by law.

The University neither affiliates knowingly with nor grants recognition to any individual, group, or organization having policies that discriminate on the basis of race, color, age, religion, sex, national origin, or handicap, as defined by applicable laws and regulations.

—Office of the President

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Address as follows:

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Vice President and Provost for Academic Affairs

Admissions, Catalogs, Records
Dean of Admissions and Records

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Coordinator of Equal Employment and Affirmative Action Affairs

Graduate Programs
Dean of Graduate School

Housing
Director of Housing

Loans, Scholarships, Work-Study
Financial Aid Office

Research
Vice President for Energy Studies, Graduate Programs, and Research

Student Life
Dean of Student Educational Services

Veterans Affairs
Financial Aid Office

West Virginia University
Morgantown, WV 26506

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Public Affairs, Harry W. Ernst, M.S.J.
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Security, William S. Strader, B.A.
University Hospital, Eugene L. Staples, M.H.A.

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Bernard R. Cooper, Ph.D., *Claude Worthington Benedum Professor of Physics.*
Samy E. G. Elias, Ph.D., *Claude Worthington Benedum Professor of Transportation.*
Edmund B. Flink, M.D., Ph.D., *Claude Worthington Benedum Professor of Medicine.*
Gabor B. Fodor, Ph.D., *Centennial Professor of Chemistry.*
Ruel E. Foster, Ph.D., *Claude Worthington Benedum Professor of American Literature.*
Frank Gagliano, M.F.A., *Claude Worthington Benedum Professor of Theatre.*
Frank M. Kearns, A.B., *Claude Worthington Benedum Professor of Journalism.*
Jay H. Kelley, Ph.D., *Distinguished Professor of Mineral and Energy Resources.*
Thomas P. Meloy, Ph.D., *Claude Worthington Benedum Professor of Mineral Processing Engineering.*
William H. Miernyk, Ph.D., *Claude Worthington Benedum Professor of Mineral and Energy Economics.*
Franklin Parker, Ed.D., *Claude Worthington Benedum Professor of Education.*
Hayne W. Reese, Ph.D., *Centennial Professor of Psychology.*
Martin W. Schein, Sc.D., *Centennial Professor of Biology.*

West Virginia University is a member of the North Central Association of Colleges and Schools. The University's educational programs are accredited by the North Central Association and by the appropriate accreditation agencies for the professional schools.

Part 1
GENERAL INFORMATION

Teacher, student, healer, artist, scientist, grower of food and forest, builder of a better world . . . these are the many faces of West Virginia University. It seeks to reconstruct the past, to understand the present, to glimpse and help create the future. The University's concerns embrace the breadth of life . . . plants and animals, man's health, his environment, his prosperity, his comfort, his humanity.

The 22,500 students that WVU serves each year are from every West Virginia county, 48 other states, and 60 foreign countries. One of the University's proudest traditions is the sending of eighteen Rhodes Scholars to Oxford University in England — far more than universities in neighboring states. WVU also ranks among the top 10 percent of the nation's colleges and universities in the number of Merit Scholars enrolled.

West Virginia University is one of the only 72 land-grant institutions serving the nation. They are called land-grant institutions because the Congressional act establishing them in 1862 gave federally owned land to each state that then sold the land and used the funds to begin a college which offered programs in agriculture and engineering.

Since its founding in 1867, WVU has developed into a comprehensive university, offering 165 degree programs in 15 schools and colleges, and it has become the center of graduate and professional education, research, and extension programs in West Virginia. It is this intellectual variety and mix that makes WVU an exciting institution with an abundance of options for its 19,000 students on the Morgantown campuses.

A variety of off-campus learning experiences are offered students that include working in state mental hospitals, with social welfare agencies, and as interns in state government; touring the region with a puppet mobile or performing musical groups; summer overseas programs; biology and geology courses at Lake Erie Biological Station and Wallops Island, Va.; geology classes at the Florida Keys; and a program in Renaissance and eighteenth-century studies at the Folger Shakespeare Library in Washington, D.C.

The campuses in Morgantown contain 89 buildings on 801 acres, valued at $263 million; libraries with more than 870,000 physical volumes, more than 691,000 microforms and microfilms, and 7,000 periodicals; and computer facilities that include an IBM 360/75 coupled to an Itel AS/5 with expanded memory and associated peripherals.

Branches include the Charleston Division, WVU Medical Center; Wheeling Division, School of Medicine; Potomac State College at Keyser, the state's only residential junior college; and five off-campus graduate centers at Jackson's Mill near Weston, Parkersburg, Potomac State, Shepherd College in the Eastern Panhandle, and at West Liberty State College in the Northern Panhandle.

WWVU-TV, West Virginia's first public television station, broadcasts courses that may be taken for University credit, as well as a variety of cultural and public affairs programs, which reach half of the state's counties.

WVU operates nine experiment farms in Hardy, Jefferson, Mason, Monongalia, Monroe, and Preston counties; six experiment forests in Greenbrier, Monongalia, Preston, Randolph, and Wetzel counties; a geology camp in Greenbrier County; and the State 4-H Camp and a museum of mid-nineteenth

century life at Jackson's Mill, the boyhood home of Confederate General Stonewall Jackson that has been entered in the National Register of Historic Places.

Potomac State's transfer programs, designed to conform to the WVU lower division, provide the freshman and sophomore years in the liberal arts and sciences as well as pre-professional studies in agriculture, business and economics, computer science, dentistry, education, engineering, engineering of mines, family resources (home economics), forestry, journalism, law, medical technology, medicine, music, nursing, pharmacy, physical education, physical therapy, social work, and veterinary medicine. Occupational programs at Potomac State which lead to the Associate in Applied Science degree include: general business, accounting, industrial management, small business administration, agriculture, computer programming, engineering technology, horticulture technology, secretarial studies, and a cooperative program in food management. New certificate programs are in Surveying Technology Assistant and Computer Equipment Operations.

Government and Organization of WVU

The *West Virginia Board of Regents* is vested by law with authority for the control and management of the University and all other state institutions of higher education. Serving on the Board are nine members appointed by the Governor, with advice and consent of the Senate, and three ex officio members including a faculty member chosen by the Regents' Advisory Council of Faculty and a student named by the Regents' Advisory Council of Students, both of whom vote, and the State Superintendent of Schools.

The president, appointed by the Board of Regents, is the chief executive officer of the University, as well as its principal academic officer — a role which his position as presiding officer of the University Senate symbolizes.

The *University Senate* is the vehicle for faculty participation in the governance of the University. It is a legislative body with original jurisdiction over all matters of academic interest and educational policy that concern the entire University or affect more than one college, school, or division. The Senate's decisions are subject to review and approval by the president and the Board of Regents. The Senate includes the president of the University as chairman, vice presidents, academic deans, five administrative officers appointed by the president, and senators elected by members of the University Faculty Assembly to represent their colleges and other constituencies. Each constituency is entitled to one senator for each twenty constituents who are members of the University Faculty Assembly. The Senate normally meets once each month.

The Senate Executive Committee elects a Faculty Chairperson each year who represents the faculty on the President's Academic-Administrative Council, on the University Budget Team, and at Staff Council meetings. Two faculty members also serve on the Provost's Advisory Committee for Promotion and Tenure.

Others serving on the Academic-Administrative Council are the Vice Presidents, Vice Provost, Executive Officer, Dean of Student Educational Services, Assistant to the President for Communications, Special Assistant to the President and Coordinator of Equal Employment Opportunity and Affirmative Action Affairs, Staff Council President, and Student Body President. Other members of the Budget Team are the Vice Presidents and Executive Officer.

The *University Faculty Assembly* includes the president as presiding officer, vice presidents, academic deans, associate deans, professors, associate

professors, assistant professors, and instructors holding appointments on a full-time basis. The Assembly normally meets twice a year.

West Virginia University also has a tradition of strong *Student Administration* that touches all aspects of student life and represents student opinion to the administration and faculty. Student Administration has two main branches: the Executive and the Board of Directors (a policy-making group composed of thirteen members which functions in the dual role of a legislative and judicial arm). More than 100 students also serve on 50 University committees including University Senate committees, the Committee on Student Discipline (two student members and three faculty members), and the Mountainlair Advisory Council (four students and four faculty members).

For non-teaching employees, there is the *Staff Council*, which consists of twelve members elected by their fellow employees in six occupational groups, and International Laborer's Union Local 814, AFL-CIO, which represents many employees.

Morgantown Area

Greater Morgantown has a population of 50,000; Monongalia County, 67,-000. Monongalia is one of the largest deep-mine, coal-producing counties in the nation, with production exceeding eleven million tons annually. WVU is the largest single employer.

Located on the east bank of the Monongahela River, which flows north to nearby Pittsburgh, Pa., Morgantown is situated on rugged terrain of the Appalachian highlands. The altitude of the city varies from 800 to 1,150 feet above sea level, and the surrounding hills rise eastward to Chestnut Ridge and reach an altitude of 2,600 feet just ten miles from the city.

The area's temperate climate is marked by four distinct seasons of about equal length. Morgantown's valley location allows it usually to escape the extremes of winter — downtown snowfall averages 25 inches annually and cold waves, which average about three a year, are blunted by the hilly terrain. Heavy winter clothing is not usually needed until after Thanksgiving.

Morgantown is served by Greyhound bus and by AeroMech Commuter Airlines.

A north-south interstate highway, I-79, is one mile west of Morgantown. U.S. Routes 19 and 119 also pass through Morgantown in the north-south direction. U.S. 48 — a four-lane, east-west highway — ties I-79 and I-81 together between Morgantown and the Cumberland-Hagerstown, Md., region.

Because of WVU's intellectual resources, the Morgantown area is becoming the major research center in the Appalachian region. Four federal agencies have research facilities in the area — Department of Health, Education and Welfare (Appalachian Laboratory for Occupational Safety and Health), Forest Service (Forestry Sciences Laboratory), Morgantown Energy Technology Center of the U.S. Energy Research and Development Administration, and Soil Conservation Service (West Virginia headquarters).

Two installations add to the area's variety. They are the Robert F. Kennedy Center, a model rehabilitation facility for younger persons who violate federal laws, and an earth tracking station of the Communications Satellite Corporation at Etam in neighboring Preston County (its 97-foot diameter antenna sends and receives world-wide telephone and other communications from satellites in outer space).

Housing

The University Housing Office, 440 Medical Center Drive (phone 304/293-3621), provides information concerning both University-owned and privately owned off-campus housing.

The University maintains 354 furnished and unfurnished apartments for married students, graduate students, faculty, and staff. Applications for these may be requested by phone or mail.

Listings for privatley owned rentals change daily; consequently, students must visit the office to see what is available and to make their own arrangements with landlords. Students are advised to secure living accommodations well in advance of the semester in which they will be enrolled.

The Morgantown housing market has been described as "fairly tight." Because of the hilly terrain, parking also is extremely limited on the WVU campuses and in the city.

Part 2

ADMISSIONS, DEGREE PROGRAMS, FEES AND EXPENSES, AND REGULATIONS AFFECTING DEGREES

Admissions

Students may be considered for admission to West Virginia University on the basis of graduation and transcripts from accredited high schools. High school graduates are required to present credit for 4 units of English and 1 unit of algebra. In addition, agriculture, chemistry, forestry, geology, the health sciences, mathematics, and physics require 1 unit of geometry. Engineering and mineral and energy resources majors are required to present 2 units of algebra, 1 unit of geometry, and 1/2 unit of trigonometry, or its equivalent. Students who do not meet these requirements in mathematics may apply for admission to the pre-engineering program in the College of Engineering or the College of Mineral and Energy Resources.

Special admissions regulations for individual colleges or schools appear in Part 3 of this *Catalog* and in Parts 2 and 4 of the *WVU Graduate School Catalog*. For admission to the various graduate programs, see the *WVU Graduate School Catalog*.

For complete admission information for the College of Law, see the *College of Law Catalog*, and for the School of Dentistry, School of Medicine, School of Nursing, and School of Pharmacy, see the *WVU Medical Center Catalog*.

All students are required to take the American College Testing (ACT) Program tests and have the report of scores sent to WVU. This test is not used for admission, but for placement, and no other test may be substituted for it.

Students interested in financial assistance must file a Financial Aid Form (FAF) with College Scholarship Service, Box 2700, Princeton, NJ 08540. Forms are available at high schools or from the College Scholarship Service, or the WVU Financial Aid Office. Submit only forms dated for the current academic year.

(*Your Guide to Financial Aid — West Virginia University* is available at the WVU Financial Aid offices, Mountainlair, Downtown Campus, and 104 Basic Sciences Building, Medical Center. The guide describes available financial aid, application procedures, and estimated educational expenses for attending WVU.)

West Virginia high school students should obtain applications for admission from their high schools. Out-of-state students may write the WVU Office of Admissions and Records and request an application form. Applicants should prepare their part of the application and then return it to their school. The school then will send the complete application and transcript of the student's high school grades directly to the WVU Office of Admissions and Records.

Nonacademic policies and regulations affecting students are summarized in the *Student Handbook*. Every student is urged to obtain a copy of the *Student Handbook* from the Office of Student Educational Services, 205 Moore Hall.

Students should apply for admission when they have met these requirements —

West Virginia Residents:

1. If, after 6 semesters of secondary school, the student has a grade-point average of 2.5 of a possible 4.0 (C+ or above), the student should apply as soon as possible after September 15.

2. If, after 7 semesters of secondary school, the student has a grade-point average of 2.0 of a possible 4.0 (C or above), the student should apply as soon as possible after beginning the 8th semester.

3. If the student has a grade-point average of 2.0 of a possible 4.0 (C average) at graduation, the student should apply immediately after graduation from secondary school.

4. Return the application to the high school. The school will complete the confidential report and mail the application, the computer sheet, and a copy of the student's high school transcript to the WVU Office of Admissions and Records. If applying on the basis of the General Educational Development (GED) examination, an official copy of the student's test scores and diploma must be sent to the WVU Office of Admissions and Records.

Out-of-State Residents:

1. If, after 6 semesters of secondary school, the student has a grade-point average of 3.0 of a possible 4.0 (B or above), the student should apply as soon as possible after September 15.

2. If, after 7 semesters of secondary school, the student has a grade-point average of 2.5 of a possible 4.0 (C+ or above), the student should apply as soon as possible after the beginning of the 8th semester.

3. If the student has a grade-point average of 2.0 of a possible 4.0 (C average) at graduation, the student should apply immediately after graduation from secondary school.

4. Return the application to the high school. The school will complete the confidential report and mail the application, the computer sheet, and a copy of the student's high school transcript to the WVU Office of Admissions and Records. If applying on the basis of the General Educational Development (GED) examination, an official copy of the student's test scores and diploma must be sent to the WVU Office of Admissions and Records.

Admission to Medical Center Programs

Applicants for admission to any of the schools of the WVU Medical Center should write to the Assistant to the Dean of Admissions and Records, WVU Medical Center, Morgantown, WV 26506, who will furnish official blanks upon which formal application must be made.

Because of the large number of applicants and limited openings available in WVU Medical Center programs, preference in admissions is given to qualified West Virginians although outstanding nonresident applicants will be considered. Careful consideration is given to those personal qualifications which bear upon fitness of applicants for the study and practice of the profession.

When requesting an application by letter for any of the Medical Center programs, the permanent home address must be given.

A $10.00 application fee is required and must accompany the applications of all but Dental Hygiene students, who pay no application fee.

Any applicant who is refused admission, or who fails to enroll after acceptance, must re-apply in the regular manner if consideration for a subsequent year is desired.

Those applicants accepted for admission to any of the programs of the WVU Medical Center, except the Division of Dental Hygiene and out-of-state applicants to the School of Dentistry, are required to deposit $50.00 before acceptance becomes official. Applicants accepted to the Division of Dental Hygiene deposit $40.00, and out-of-state applicants accepted to the School of Dentistry deposit $100. If the applicant enrolls in the program of the applicant's choice, the deposit is applied to first semester tuition.

If an application for admission to the School of Medicine is withdrawn after the applicant has been offered a place and has submitted a deposit, such deposit may be refunded any time before March 30 of the year in which enrollment is anticipated, but will not be refunded after this date. Deposits submitted to all other programs are nonrefundable.

It is required that during the first semester of the first year all WVU Medical Center students must complete certain prescribed immunization and diagnostic procedures.

Admission of Transfer Students

Applicants for transfer from another college or university should submit the following to the Office of Admissions and Records:

1. A complete application for undergraduate admission.
2. A certified transcript of all college work taken to date, including a statement of good standing. A certified statement covering subjects subsequently taken should be sent as soon as it is available.
3. Catalog pages describing all subjects which have or will have been completed. The applicant's name should be written on each page and each subject indicated by a check mark in the margin. Complete catalogs should not be sent. (Not necessary from West Virginia colleges.)

The cumulative average of all work attempted before transfer must be at least C.

Credits and grades earned for all baccalaureate level courses at any baccalaureate degree-granting institution in the West Virginia state system of higher education and up to 72 hours of credits and grades earned for college-parallel courses completed at community colleges or branch colleges in the West Virginia state system shall be transferable toward a bachelor's degree. (See also "Requirements As to Residence," page 33.)

Credits (though not grades) are transferable from institutions outside the West Virginia state system for courses carrying a grade of C or higher. A grade of D on the first of sequence courses may be transferred if the second course grade is C or higher.

Credits from two-year community colleges and junior colleges outside the West Virginia state system are limited to 72 hours of lower-division courses. These colleges must be accredited by the North Central Association of Colleges and Schools or another regional accrediting association.

The transfer of credits does not exempt the student from satisfying all the requirements for the student's degree program at WVU.

An average of 2.0 on all mathematics courses completed is required for transfer into the College of Engineering or the College of Mineral and Energy Resources.

All transcripts must be in the Office of Admissions and Records three weeks in advance of registration.

Evaluation of transcripts for transfer of credit is furnished only after receipt of complete official transcripts and application for admission.

Transfer students generally are admitted only after they complete one full year at another institution. Applicants who have less than one full year of college work elsewhere must submit both their college and high school records. Students who have successfully completed 6 hours or less at another accredited institution will apply as freshmen.

Intrauniversity Transfers

Students transferring from Potomac State College of WVU shall be considered intrauniversity transfers. All records made at Potomac State College are part of the student's WVU record, but no more than 72 hours may be applied toward the baccalaureate degree.

If a change of major is involved, the transferee should consult the college, school, or department to which the student is transferring concerning requirements for the new major.

Admission of Special Students

Persons not desiring to become candidates for a degree may, by special permission, be admitted as special students. Such students are subject in all respects to the usual rules relating to registration and scholarship. Admission to any class is subject to the approval of the instructor in charge.

Students who do not plan to follow a degree program at WVU should submit only a statement of good standing from the last college attended.

Admission of Post-Baccalaureate Students

Students possessing one or more earned degrees from an approved college or university and desiring to enroll for undergraduate credit may be admitted as post-baccalaureate students. Students admitted in this category would not be working toward a graduate degree and credit earned while under this classification would be limited to undergraduate credit. Students admitted as post-baccalaureate, since they are limited to undergraduate credit, would be assessed undergraduate fees. Candidates for admission to this classification who are not graduates of WVU must submit an official transcript from the institution granting their latest degree.

Admission of Foreign Students

Foreign students wishing to enroll in WVU must comply with the academic requirements for admission which have already been stated and with certain additional academic and nonacademic requirements as follows.

Early Inquiry and Application

Foreign applicants should forward a letter of inquiry one year before the intended time of beginning study in the United States. Foreign students admitted are expected on campus at the beginning of July for a six-week period of orientation and intensive study of English. Accordingly, all the papers on which admission is based must have been received at the University at the very latest by April 1, to allow sufficient time for their processing and the communication of the decision to the student, as well as for the student to make arrangements for passport and visa clearance and other necessary details.

Foreign students should make all arrangements for their financial obligations to WVU for their entire stay in the United States before leaving their country.

Because of the large number of applicants and limited openings available in WVU Medical Center programs, preference in admissions is given to qualified West Virginians although outstanding nonresident applicants will be considered. Careful consideration is given to those personal qualifications which bear upon fitness of applicants for the study and practice of the profession.

English Proficiency

No person should undertake study at WVU who is not competent in the use of English. All foreign applicants the language of whose family and schooling was other than English must present a composite score of 550 on the "Test of English As a Foreign Language" (TOEFL).

Information on locations of TOEFL testing centers, dates of testing, and application forms is available from the Educational Testing Service, Princeton, NJ 08540 USA. Tests are normally given four times each year. It usually requires about one month to score and report individual test results. Registration for the TOEFL examination closes five weeks before the testing date.

Credentials

Complete and original official records of all studies undertaken by an applicant at any institution attended (secondary school, college, university, technical school, professional school, etc.), must be provided at time of application for admission to WVU. Records may be copies, provided they are officially stamped. The records must show evidence of the study the applicant has done in the field of intended study at WVU.

Such records should include: (1) complete dates of attendance; (2) identification of individual subjects; (3) total number of hours in each class per week; (4) total number of weeks each class has in session; (5) final grade in each subject, for each year; (6) actual credits earned for each subject; (7) class, division, or rank achieved; (8) identification of individual; (9) description and clarification of each institution grading system; and (10) certification, and date, of degree or awards achieved, if not a part of the mark sheet or transcript. If any of this information cannot be supplied, an official explanatory statement from the school should be submitted. (All documents must be in English.)

All documents should be forwarded directly from the Registrar or other authorized official of the school to the WVU Office of Admissions and Records.

If an applicant is currently enrolled in a school, tentative admission may be granted on the basis of an incomplete record which indicates the applicant will unquestionably meet the admission standards of WVU. Final admission, however, cannot be approved until the complete record has been received and evaluated.

Foreign Students Transferring Within the U.S.

Foreign students applying to transfer from schools within the United States are advised that they will not be admitted and permitted to register at WVU unless they have complied well in advance with all requirements of the United States Immigration and Naturalization Service (INS).

The school the student was last authorized to attend must have completed and signed the INS form I-538. This, together with a valid I-20 form received from WVU must have been submitted to the INS office having jurisdiction over the school the student was last authorized to attend. If the student is not now attending that school, a letter must be added explaining in detail why.

If the INS approves the transfer, this approval will be stamped on the student's I-94. The student must then immediately notify WVU that the transfer has been approved, either by sending an INS statement of transfer approval, or simply by reporting the fact that the approval appears on the I-94.

Only when these procedures have been completed will WVU undertake to admit and register the student. No student should move to Morgantown without having received this assurance of admission from WVU.

Admission of Veterans

Veterans may be admitted to WVU with less than the minimum admission requirements necessary for other, nonveteran applicants.

Information regarding educational opportunities made possible at the University through provisions of the Veterans Readjustment Benefits Act of 1966 — G.I. Bill (Public Law 358), the Vocational Rehabilitation Program of the Veterans Administration (Public Law 16), and the War Orphan's Educational Assistance Act of 1956 (Public Law 634) may be obtained from the Veterans Counselor by personal conference at his office in Mountainlair or by mail. An amendment to Public Law 634, enacted in 1964, provides benefits to many dependents of 100 percent disabled veterans.

Veterans having at least one continuous year of active military service may receive advanced placement credit for Physical Education 1 and 2. Proof of such military service must be presented to the Dean of Admissions and Records.

Because of the large number of applicants and limited openings available in WVU Medical Center programs, preference in admissions is given to qualified West Virginians although outstanding nonresident applicants will be considered. Careful consideration is given to those personal qualifications which bear upon fitness of applicants for the study and practice of the profession.

Readmission

Undergraduate students who leave the University for at least one complete semester are required to submit an application for readmission to the Dean of Admissions and Records.

Students who have been suspended from the University must have written approval from the dean of the school or college from which the student was suspended.

Approval in writing must be secured in advance to elect courses offered elsewhere. A cumulative average of C is required in order to obtain such approval. Credit will be accepted for transfer for courses carrying a grade of C or higher when the conditions indicated above have been met.

Students wishing to change their major upon readmission must have permission from their previous dean and the dean of the college to which they wish to transfer.

Degree Programs Offered by WVU

College of Agriculture and Forestry

Major or Degree Program	Bachelor	Master	Doctorate
Agricultural Biochemistry		M.S.	Ph.D.
Agricultural Economics		M.S.	
Agricultural Education	B.S.Agr.	M.S.	
Agricultural Microbiology			Ph.D.
Agriculture		M.Agr.	
Agronomy		M.S.	Ph.D.
Animal Nutrition			Ph.D.
Animal Science		M.S.	
Animal and Veterinary Sciences	B.S., B.S.Agr.		
Forest Resources Management	B.S.F.		
Forest Resources Science			Ph.D.
Forestry		M.S.F.	
Genetics		M.S.	Ph.D.
Horticulture		M.S.	
Landscape Architecture	B.S.L.A.		
Plant Pathology		M.S.	Ph.D.
Plant and Soil Sciences	B.S.Agr.		
Recreation	B.S.R.	M.S.	
Reproductive Physiology		M.S.	Ph.D.
Resource Management	B.S., B.S.Agr		
Wildlife Management		M.S.	
Wildlife Resources	B.S.		
Wood Industries	B.S.F.		

College of Arts and Sciences

Biology	B.A.	M.S.	Ph.D.
Chemistry	B.A., B.S.	M.S.	Ph.D.
Computer Science	B.S.	M.S.	
Economics	B.A.		
English	B.A.	M.A.	Ph.D.
Foreign Languages	B.A.	M.A.	
Geography	B.A.		
Geology	B.A., B.S.	M.S.	Ph.D.
History	B.A.	M.A.	Ph.D.
Interdepartmental Studies	B.A.		
Mathematics	B.A.	M.S.	
Philosophy	B.A.		
Physics	B.S.	M.S.	Ph.D.
Political Science	B.A.	M.A.	Ph.D.
Public Administration		M.P.A.	
Psychology	B.A.	M.A.	Ph.D.
Sociology and Anthropology	B.A.	M.A.	
Speech Communication	B.A.	M.A.	
Statistics	B.S.	M.S.	

Major or Degree Program	Bachelor	Master	Doctorate

Board of Regents Bachelor of Arts Degree

(Intended for older students who wish to resume and complete their college studies. Detailed information available from the Coordinator, Board of Regents B.A. Degree Program, Student Services Center, West Virginia University, Morgantown, WV 26506.)

College of Business and Economics

Accounting	B.S.B.Ad.		
Business Administration		M.B.A.	
Business Management	B.S.B.Ad.		
Economics	B.S.	M.A.	Ph.D.
Finance	B.S.B.Ad.		
Industrial Relations		M.S.	
Marketing	B.S.B.Ad.		

Creative Arts Center

Art	B.A.	M.A.	
Music	B.M.	M.M.	D.M.A. Ph.D., Ed.D.
Theatre	B.F.A.	M.A.	
Visual Art	B.F.A.	M.F.A.	

School of Dentistry

Dental Hygiene	B.S.		
Dentistry			D.D.S.
Orthodontics		M.S.	

College of Engineering

Engineering		M.S.E.	Ph.D.
Aerospace Engineering	B.S.A.E.	M.S.A.E.	
Chemical Engineering	B.S.Ch.E.	M.S.Ch.E.	
Civil Engineering	B.S.C.E.	M.S.C.E.	
Electrical Engineering	B.S.E.E.	M.S.E.E.	
Industrial Engineering	B.S.I.E.	M.S.I.E.	
Mechanical Engineering	B.S.M.E.	M.S.M.E.	

College of Human Resources and Education

Education			C.A.S., Ed.D.
Counseling and Guidance		M.A.	
Education Administration		M.A.	
Educational Psychology		M.A.	
Elementary Education	B.S.E.Ed.	M.A.	

Major or Degree Program	Bachelor	Master	Doctorate
Family Resources	B.S.Fam.Res.	M.S.	
Reading		M.A.	
Rehabilitation Counseling		M.S.	
Secondary Education	B.S.S.Ed.	M.A.	
Special Education		M.A.	
Speech Pathology and Audiology	B.S.	M.S.	

Interdisciplinary Programs

Genetics and Developmental Biology		M.S.	Ph.D.
Reproductive Physiology		M.S.	Ph.D.
Community Health Education		M.S.	

School of Journalism

Journalism	B.S.J.	M.S.J.	

College of Law

Law			J.D.

School of Medicine

Anatomy		M.S.	Ph.D.
Biochemistry (Medical)		M.S.	Ph.D.
Medical Technology	B.S.	M.S.	
Medicine			M.D.
Microbiology		M.S.	Ph.D.
Pharmacology		M.S.	Ph.D.
Physical Therapy	B.S.		
Physiology and Biophysics		M.S.	Ph.D.

College of Mineral and Energy Resources

Engineering in cooperation with College of Engineering			Ph.D.
Engineering of Mines	B.S.E.M.	M.S.E.M.	
Mineral and Energy Resources		M.S.	Ph.D.
Mineral Processing Engineering	B.S.		
Petroleum Engineering	B.S.Pet.E.	M.S.Pet.E.	

School of Nursing

Nursing	B.S.	M.S.N.	

School of Pharmacy

Pharmaceutical Sciences		M.S.	Ph.D.
Pharmacy	B.S.Pharm.		

Major or Degree Program	Bachelor	Master	Doctorate
School of Physical Education			
Education in cooperation with Human Resources and Education			Ed.D., C.A.S.
Environmental/Occupational Health Studies		M.S.	
Physical Education	B.S.P.Ed.	M.S.	
Physical Education Interdisciplinary	B.S.P.Ed.		
Safety Studies		M.S.	
School of Social Work			
Social Work	B.S.	M.S.	

Academic Common Market

West Virginia provides its residents opportunity, through the Academic Common Market and through contract programs, to pursue academic programs not available within the state. Both programs permit West Virginians to enter out-of-state institutions at reduced tuition rates.

Contract programs have been established for study in veterinary medicine, optometry, architecture, and podiatry; and the Academic Common Market provides access to numerous graduate programs. The programs are restricted to West Virginia residents who have been accepted for admission to one of the specific programs at designated out-of-state institutions.

Through reciprocal agreement WVU allows residents of states within the Academic Common Market to enroll in specific graduate programs on an in-state tuition basis.

Further information may be obtained through the Graduate Dean. In each case application must be made through the higher education authority of the state of residence. For West Virginia residents this is the West Virginia Board of Regents, 950 Kanawha Boulevard, East, Charleston, WV 25301.

Fees and Expenses

All West Virginia University fees are subject to change without notice.

All fees are due and payable to the Comptroller on the days of registration. Medical Center students pay their fees at the Comptroller's Office, Basic Sciences Building. Students must pay fees before registration is accepted. Completion of arrangements with the Comptroller's Office for payment from officially accepted scholarships, loan funds, grants, or contracts shall be considered sufficient for acceptance of registration. Fees paid after regular registration must be paid to the University Cashier in Mountainlair. Medical Center students pay at the Comptroller's Office, Basic Sciences Building.

All students are expected to register on days set apart for registration at the beginning of each semester or session of the University.

No student will be permitted to register at the University after the twelfth day of a semester or the fourth calendar day of the summer session or a summer term. Days are counted from the first day of registration.

Any student failing to complete registration on regular registration days is subject to the Late Registration Fee of $10.00.

Students registering pay the fees shown in the fees charts, plus special fees and deposits as required.

No degree will be conferred upon any candidate before payment of all tuition, fees, and other indebtedness to any unit of the University.

Persons not registered as University students and who are not members of its administrative or teaching staffs shall not be admitted to regular attendance in University classes.

Summer Fees

Tuition per semester hour	Resident	Nonresident
Undergraduate students	$11.00	$53.00
Professional and Graduate students	16.00	73.00
Dentistry and Medicine students	22.00	82.00
Daily Athenaeum Fee*	.55	.55
Health, Counseling, and Program Services Fee	12.00	12.00
Mountainlair Construction Fee per 6-week summer session or any portion thereof*	7.50	7.50
Student Educational Services Fee	5.65	5.65
Transportation FEE	7.30	7.30

*Fee required of all students. (Nonrefundable unless student withdraws officially before the close of general registration.)

Fees for Off-Campus Courses

Fees for credit hours for off-campus students are the same as those charged students enrolled in on-campus courses. Off-campus students do not pay the Daily Athenaeum Fee or the Mountainlair Construction Fee.

Semester Fees in Colleges and Schools

(Subject to Change Without Notice.)

FULL-TIME[1]

UNDERGRADUATE[a, f]

	Tuition	*Registration*	*Higher Education Resources*	*Institutional Activity*	*Mountainlair Construction*	*TOTAL*
Resident	$ 40.00	$ 50.00	$ 35.00	$84.50[e]	$20.00	$229.50
Nonresident	205.00	250.00	180.00	84.50[e]	20.00	739.50
	PROFESSIONAL AND GRADUATE[b,f]					
Resident	$ 55.00	$ 50.00	$ 35.00[c]	$84.50[e]	$20.00	$244.50
Nonresident	230.00	250.00	180.00[c]	84.50[e]	20.00	764.50
	DENTISTRY AND MEDICINE[f]					
Resident	$117.00	$ 50.00	Not Applicable[d]	$84.50[e]	$20.00	$271.50
Nonresident	335.00	250.00	Not Applicable[d]	84.50[e]	20.00	689.50

[a]Undergraduate students enrolled for 12 or more credit hours pay maximum charges as indicated. Students enrolled for less than 12 credit hours pay a pro-rated charge calculated in direct proportion to the number of credit hours taken.

[b]Professional and graduate students enrolled for 9 or more credit hours pay maximum charges as indicated. Students enrolled for less than 9 credit hours pay a pro-rated charge calculated in direct proportion to the number of credit hours taken.

"Professional and Graduate," for fee purposes, includes all programs in the Medical Center, except Dentistry, Medicine, and Pharmacy; all programs in the Graduate School, and in the College of Law.

[c]Paid by Law and Graduate students only. Others pay appropriate laboratory and microscope fees.

[d]Dental and Medical students pay appropriate laboratory and microscope fees.

[e]Includes Athletics Fee, $15.00; Student Educational Services Fee, $15.00; Daily Athenaeum Fee, $1.50; Health, Counseling, and Program Services Fee, $31.00; Transportation Fee, $15.00.

[f]All part-time students enrolled for 7 or more credit hours must pay the Institutional Activity and Mountainlair Construction Fee.

PART-TIME[2]

Tuition per semester hour	*Resident*	*Nonresident*
Undergraduate Students	$11.00	$54.00
Professional and Graduate Students	16.00	73.00
Dentistry and Medicine Students	22.00	82.00

The minimum rate for noncredit courses is that charged for one semester hour of credit.

[1]A full-time professional or graduate student is one who is registered for 9 or more semester hours of work each semester of the regular academic year, or 6 or more semester hours of work during the summer. A full-time student during the regular academic year and all students during the summer are entitled to free medical consultation and advice from the University physician. A moderate charge is made for room calls, X-rays, special laboratory tests, drugs furnished by the University Pharmacy, minor operations, treatment of fractures and dislocations, and intravenous treatment.

A full-time undergraduate student is one who is registered for 12 or more semester hours of work each semester of the regular academic year, or 6 or more semester hours of work during a 6-week summer session. A full-time student during the regular academic year receives an identification card which entitles the student to all athletic events. A full-time student during the regular academic year and all students during the summer are entitled to free medical consultation and advice from the University physician. A moderate charge is made for room calls, X-rays, special laboratory tests, drugs furnished by the University Pharmacy, minor operations, treatment of fractures and dislocations, and intravenous treatment.

[2]For fee assessment purposes, a part-time professional or graduate student is one who is registered for fewer than 9 semesters hours per semester during the regular academic year, or for fewer than 6 semester hours during a 6-week summer session.

A part-time undergraduate student is one who is registered for fewer than 12 semester hours per semester during the regular academic year, or for fewer than 6 semester hours during a 6-week summer session.

Estimated Expenses for Medical Center Programs (First Semester) [Subject to Change]

Tuition and registration are the same for both semesters. Some expenses, such as fees, instruments, and book costs will be different for the Second Semester.

School or Division	Tuition and Registration Fees			Instruments	Lab Coats, Uniforms, etc.	Books	TOTAL	
	Resident	Nonresident	Fees*				Resident	Nonresident
Dental Hygiene								
Freshman	$209.50	$584.50			$ 10.00	$100.00	$ 319.50	$ 694.50
Sophomore	209.50	584.50	$25.00	$ 80.00	150.00	110.00	574.50	949.50
Junior	209.50	584.50	5.00	100.00	60.00	100.00	474.50	849.50
Senior	209.50	584.50	5.00	50.00	60.00	25.00	349.50	724.50
Dentistry								
First Year	271.50	689.50	38.00	1,725.00	55.00	305.00	2,394.50	2,812.50
Summer	231.00	684.60	9.00	1,300.00		75.00	1,615.00	2,068.60
Second Year	271.50	689.50	38.00	480.00		241.00	1,030.50	1,448.50
Summer	165.00	525.00	10.00	150.00			325.00	685.00
Third Year	271.50	689.50	14.00			85.00	370.50	788.50
Summer	32.15	92.15	10.00				42.15	102.15
Fourth Year	271.50	689.50	20.00				291.50	709.50
Medical Technology								
Junior	209.50	584.50	35.00		37.00	171.00	452.50	827.50
Summer	123.90	343.90			130.00	82.50	336.40	556.40
Senior	209.50	584.50					209.50	584.50
Medicine								
First Year	271.50	689.50	45.00	75.00	30.00	160.00	581.50	999.50
Second Year	271.50	689.50	55.00	230.00	30.00	125.00	711.50	1,129.50
Third Year	271.50	689.50			15.00	120.00	406.50	824.50
Fourth Year	271.50	689.50			15.00	120.00	406.50	824.50
Nursing								
Sophomore	209.50	584.50	5.00		83.00	115.00	412.50	787.50
Summer	123.00	453.00	5.00			31.00	159.00	489.00
Junior	209.50	584.50	5.00			77.00	291.50	666.50
Senior	209.50	584.50	5.00			83.00	297.50	672.50
Pharmacy								
Third Year	244.50	764.50			13.00	120.00	377.50	897.50
Fourth Year	244.50	764.50			13.00	90.00	347.50	867.50
Summer	244.50	764.50					244.50	764.50
Fifth Year	244.50	764.50			13.00	75.00	332.50	852.50
Physical Therapy								
Junior	209.50	584.50	5.00	15.00	40.00	180.00	449.50	824.50
Senior	209.50	584.50	5.00		40.00	160.00	414.50	789.50
Summer	47.10	212.10	10.00				57.10	222.10

*Fees—Includes lab fees, microscope rental, or graduation fee.

TUITION & REGISTRATION FEES BREAKDOWN			Tuition	Registration	Higher Education Resources	Institutional Activity	Mountainlair Construction	TOTAL
Dent. Hy., Med. Tech., Nursing & Phys. Ther.	Full-time 9 hr. or more	RESIDENT	$ 55.00	$ 50.00		$84.50	$20.00	$209.50
		NONRESIDENT	230.00	250.00		84.50	20.00	584.50
Pharmacy & Graduate	Full-time 9 hr. or more	RESIDENT	55.00	50.00	35.00	84.50	20.00	244.50
		NONRESIDENT	230.00	250.00	180.00	84.50	20.00	764.50
Dentistry & Medicine	Full-time 9 hr. or more	RESIDENT	117.00	50.00		84.50	20.00	271.50
		NONRESIDENT	335.00	250.00		84.50	20.00	689.50

TUITION PER SEMESTER HOUR—PART-TIME & SUMMER (Under 9 hr.) — Resident — Nonresident

Dental Hygiene, Medical Technology, Nursing & Physical Therapy
Pharmacy & Graduate — $15.00—per Credit Hour— $70.00
Dentistry & Medicine — $22.00—per Credit Hour— $82.00 — plus Special Fees

SPECIAL FEES: SEMESTER $21.50 per semester; SUMMER $8.05 under 6 hr. — $33.00 6 hr. & up per session

Special Fees

Application for Admission (College of Law and Graduate School)	$10.00
Certificate of Advanced Study in Education	2.00
Diploma Replacement	5.00
Examination for Advanced Standing	3.00
Examination for Entrance Credit, per unit	1.00
Examiniation of Candidate for Graduate Degree	1.00
(For graduate students not otherwise enrolled at time of final examination.)	
General Educational Development Tests (high school level)	15.00
(If the applicant applies for admission to and registers in WVU within twelve months of the date of qualifying for the test, a $10.00 credit shall be established for applicant.)	
Graduation	10.00
(Payable by all students at the beginning of the semester or term in which they expect to receive their degrees.)	
Late Registration (nonrefundable)	10.00
(Not charged to students who complete registration during the regular registration days set forth in the University Calendar.)	
Professional Engineering Degree (includes $10.00 Graduation Fee)	25.00
Reinstatement of Student Dropped from the Rolls	3.00
Student Identification Card Replacement	1.00
Student's Record Fee	1.00
(One transcript of a student's record is furnished by the Dean of Admissions and Records without charge. This fee is charged for furnishing an additional transcript.)	

Laboratory Fees

Consult specific departmental sections of this *Catalog* concerning nonrefundable deposits and microscope rental fee.

Music Practice and Rental Fees

Practice Room Fee: All music majors must pay a fee of $6.00 per semester, which entitles them to assigned practice space one hour per day. Additional space may be available at the rate of $4.00 per hour.

Band and Orchestra Instruments: Rental, $10.00 per semester.

Service Charge on Returned Checks

A service charge of 5 percent of the amount of each check returned unpaid by the bank upon which it is drawn shall be collected unless the student can obtain an admission of error from the bank.

If the check returned by the bank was in payment of University and registration fees, the Comptroller's Office shall declare the fees unpaid and registration cancelled if the check has not been redeemed within three days from date of written notice. In such a case the student may be reinstated upon redemption of the check, payment of the 5 percent service charge, Reinstatement Fee of 3.00, and Late Payment Fee of $10.00.

Refunding of Fees

A student who officially withdraws from University courses may arrange for a refund of fees by submitting to the University Comptroller evidence of eligibility for a refund.

To withdraw officially, a student must apply to the Dean of Admissions and Records for permission. Semester fees will be returned in accordance with the following schedule:

First refund period ending on the twelfth day following beginning of general registration	All activity fees chargeable to Special Services and all other semester fees less $2.50. (Under no circumstances is the amount retained less than $2.50.)
Second refund period ending on the fifth Friday following beginning of general registration	70% of all refundable fees.
Last refund period ending on the eighth Friday following beginning of general registration	40% of all refundable fees.

The second Friday following beginning of general registration for the summer session is the end of the refund period.

No part of the Activity Fee is refundable unless the student withdraws from the University.

University policy provides that students called to the armed services of the United States may be granted full refund of refundable fees, but no credit, if the call comes before the end of the first three-fourths of the semester, and that full credit by courses be granted to persons called to the armed services of the United States if the call comes thereafter; provided, however, that credit as described above will be granted only in those courses in which the student is maintaining a passing mark at the time of departure for military service. In the recording of final grades, for three-fourths of a semester or more, both passing and failing grades are to be shown on the student's permanent record.

Cost of an Academic Year's Work

The Financial Aid Office estimates that the total cost of attending WVU for a nine-month academic year is $3,100 for single West Virginia residents living on or off-campus and $2,100 for those living at home; $4,100 for single nonresidents living on or off-campus and $3,100 for those living at home.

These typical student budgets include tuition and fees, deposits, books and supplies, room, board, transportation, and personal expenses that provide for a modest but adequate life-style.

Identification Card

An identification card is issued to each full-time student upon paying full fees. It entitles the owner admission to certain University athletic events, various activities of student administration, Health Service, and Mountainlair.

Confiscation will result from misuse. The University reserves the right to refuse reissuance of an identification card.

Residential Status

The West Virginia Board of Regents has adopted regulations governing the classification of students as residents or nonresidents for admission and fee purposes at all institutions under its jurisdiction.

General

Students enrolling in WVU shall be classified as resident or nonresident for admission, tuition, and fee purposes by the Dean of Admissions and Records. The decision shall be based upon information furnished by the student and all other relevant information. The Dean of Admissions and Records is authorized to require such written documents, affidavits, verifications, or other evidence as are deemed necessary to establish the domicile of a student. The burden of establishing residency for tuition and fee purposes is upon the student.

If there is a question as to residence, the matter must be brought to the attention of the Dean of Admissions and Records and passed upon at least two weeks before registration and payment of tuition and fees. Any student found to have made a false or misleading statement concerning the student's residence shall be subject to disciplinary action and will be charged the nonresident fees for each session theretofore attended.

Residence Determined by Domicile

Domicile within the state means adoption of the state as a fixed permanent home and involves personal presence within the state with no intent on the part of the person to return to another state or country. West Virginia domicile may be established upon the completion of at least twelve months of continued residence within the state before the date of registration, provided that such twelve months residency is not primarily for the purpose of attendance at any institution of learning in West Virginia.

Establishment of West Virginia domicile with less than twelve months residence before the date of registration must be supported by proof of positive and unequivocal action, such as, but not limited to, the purchase of a West Virginia home, full-time employment within the state, paying West Virginia property tax, filing West Virginia income tax returns, registering to vote in West Virginia and the actual exercise of such right, registering of motor vehicles in West Virginia, and possessing a valid West Virginia driver's license. Additional items of lesser importance include transferring or establishing local church membership, involvement in local community activities, affiliation with local social, civic, fraternal, or service organizations, and various other acts which may give evidence of intent to remain indefinitely within the state. Proof of a number of these actions shall be considered only as evidence which may be used in determining whether or not a domicile has been established.

Minors

Minors are defined by the West Virginia Code (2-2-10) as persons under 18 years of age. The residence of a minor shall follow that of the parents at all

times, except in extremely rare cases where emancipation can be proved beyond question. The residence of the father, or the residence of the mother if the father is deceased, is the residence of the unmarried or unemancipated minor. If the father and the mother have separate places of residence, the minor takes the residence of the parent with whom the minor lives or to whom the minor has been assigned by court order. The parents of a minor will be considered residents of West Virginia if their domicile is within the state.

A minor student who is properly admitted to an institution as a resident student shall retain that classification as long as the student enrolls each successive semester.

Emancipated Minor

An emancipated minor may be considered as an adult in determining residence, provided satisfactory evidence is presented that neither of the parents, if living, contribute to the minor's support nor claim the minor as a dependent for federal or state income tax purposes.

In the event that the fact of emancipation is established, the emancipated minor assumes all of the responsibilities of an adult to establish residence for tuition and fee purposes. Proof must be provided that emancipation was not achieved principally for the purpose of establishing residence for attendance at an institution of higher education.

Students 18 Years of Age or Over

A student 18 years of age or over may be classified as a resident if: (1) the parents were domiciled in the state at the time the student reached majority and such student has not acquired a domicile in another state, or (2) while an adult the student has established a bona fide domicile in West Virginia. Bona fide domicile in West Virginia means that the student must not be in the state primarily to attend an educational institution and the student must be in the state for purposes other than to attempt to qualify for resident status.

Any nonresident student who reaches the age of 18 years while a student at any educational institution in West Virginia does not by virtue of such fact alone attain residence in this state for admission or tuition and fee payment purposes.

A student who is properly classified as a resident at the time of attaining the age of 18 shall continue to be classified as a resident as long as the student enrolls each successive semester and does not establish a domicile, or legal residence, in another state.

Change of Residence

An adult student who has been classified as an out-of-state resident and who seeks resident status in West Virginia must assume the burden of proving conclusively that the student has established domicile in West Virginia with the intention of making the student's permanent home in this state. The intent to remain indefinitely in West Virginia is evidenced not only by a person's statements but also by a person's actions. The Dean of Admissions and Records in making his determination shall consider such actions as, but not limited to, the purchase of a West Virginia home, full-time employment within the state, paying West Virginia property tax, filing West Virginia income tax returns, registering to vote in West Virginia and the actual exercise of such right, register-

ing of motor vehicles in West Virginia, and possessing a valid West Virginia driver's license. Additional items of lesser importance include transferring or establishing local church membership, involvement in local community activities, affiliation with local social, civic, fraternal, or service organizations, and various other acts which may give evidence of intent to remain indefinitely within the state. Proof of a number of these actions shall be considered only as evidence which may be used in determining whether or not a domicile has been established. Factors militating against a change in residence classification may include such considerations as the fact that the student is not self-supporting, that the student is carried as a dependent on the parents' federal or state income tax returns or the parents' health insurance policy, and that the student customarily does not remain in the state when school is not in session.

Marriage

The residence of a married person is determined by the same rules of domicile which would apply if he or she were not married.

Military

An individual who is on active military service or an employee of the federal government may be classified as a resident for the purpose of payment of tuition and fees provided the individual established a domicile in West Virginia before entrance into federal service, that the individual entered the federal service from West Virginia, and that the individual has at no time while in federal service claimed, or established, a domicile in another state. Sworn statements attesting to these conditions may be required. The wife and dependent children of such individuals also shall be classified as residents of the state of West Virginia for tuition and fee purposes. Persons assigned to full-time active military service and residing in West Virginia may be classified as in-state residents for tuition and fee purposes after twelve months of continuous location in the state.

Aliens

An alien in the United States on a resident visa, or who has filed a petition for naturalization in the naturalization court, and who has established a bona fide domicile in West Virginia may be eligible for resident classification, provided the alien is in the state for purposes other than to attempt to qualify for residency status as a student.

Appeal Process

The decisions of the Dean of Admissions and Records may be appealed to the President of WVU. The President may establish such committees and procedures as he determines necessary for the processing of appeals. The decision of the President may be appealed in writing with supporting documentation to the West Virginia Board of Regents in accord with such procedures as may be prescribed from time to time by the Board of Regents.

Regulations Affecting Degrees

Candidates for degrees are eligible for graduation when they complete the requirements in the college or school in which they are registered which were in effect at the time of their first registration in that college or school, provided they graduate within a period of seven years from the time of their first registration. Students who do not complete the requirements for graduation within seven years from their first registration must meet *all the conditions* of a later *Catalog* — one that will be no more than seven years old by the time they graduate.

If there are major changes in the *Undergraduate Catalog* during the student's course of study, the student does not have to abide by them unless they are promulgated by the Board of Regents, or by local, state, or federal law. However, by choice and with the approval of adviser and the Dean, a student may meet *all the conditions* of a later *Undergraduate Catalog* than that under which the student first registered in that college or school.

University policy provides that in view of public and professional responsibilities, the faculty of each of the professional schools of WVU has the authority to recommend to the president of WVU the removal of any student from its rolls whenever, by formal decision reduced to writing, the faculty finds that the student is unfit to meet the qualifications and responsibilities of the profession.

All degrees are conferred by the Board of Regents upon recommendation of the faculties of the various colleges and schools. Degrees are granted at the close of the semester or summer session in which the students complete their work.

Baccalaureate Degrees

Credits Required

In addition to the University requirements listed in this *Catalog*, each baccalaureate degree is conditional upon the completion of a specified number of semester hours of credit, as determined by the student's degree program requirements. Students must, therefore, familiarize themselves with their college and degree program requirements, as given in Part 3 of this *Catalog*.

Physical Education

Two hours of physical education, to be taken during the first year in residence, are required for graduation, except in the case of students entering with advanced standing amounting to 58 semester hours or more. (See "General Program" in the School of Physical Education section of the *Undergraduate Catalog*.) The University Health Service will determine whether students are physically qualified for required physical education courses and for active participation in other University activities.

University Core Curriculum

I. Two semesters of English Composition and Rhetoric (English 1 and 2) are required of all candidates for the bachelor's degree in all colleges and schools of the University, unless part or all of the requirements for certain students of superior achievement is waived under regulations prevailing at the

time of admission. Such students will be informed of their eligibility by the Coordinator of Writing Programs in English.

II. Remedial work in mathematics to cover the deficiency if the student, upon entering the University, lacks proficiency in mathematics equal to that normally attained in two years of high school mathematics.

III. Twelve* credit hours of work in selected approved courses in each of the three following areas, including courses in at least two subjects in each group:

Group A

1. Art
2. English (exclusive of English 1 and 2)
3. Humanities
4. Languages
5. Music
6. Philosophy
7. Religious Studies
8. Selected Multidisciplinary Studies
9. Speech Communication
10. Theatre

Group B

1. Economics
2. Forestry 140
3. Geography
4. History
5. Minerals 97
6. Political Science
7. Psychology
8. Selected Multidisciplinary Studies
9. Social Science
10. Sociology/Anthropology

Group C

1. Bacteriology
2. Biology
3. Chemistry
4. Computer Science
5. Entomology
6. Engineering 111
7. Genetics
8. Geology
9. Mathematics
10. Nutrition
11. Physical Science
12. Physics/Astronomy
13. Physiology
14. Selected Multidisciplinary Studies
15. Statistics

*Two 4-credit courses and one 3-credit course may be substituted in lieu of 12 credit hours.

The determination as to whether ROTC courses will be counted toward fulfillment of the Core Curriculum or will be counted as free electives is the prerogative of the department chairperson or dean of the appropriate college or school. This is in keeping with the Board of Regents' order effective at the end of the first semester of the 1967-68 academic year which stipulated that "each academic division of the University must allow at least 8 hours of credit toward graduation for courses in Military Science (ROTC) and Air Force Aerospace Studies (ROTC), if earned during the first two years of enrollment . . . A student electing to take Military Science (ROTC) or Air Force Aerospace Studies (ROTC) should consult the student's department chairperson or dean of the student's college or school for determination as to how the 8 hours of academic credit will be credited toward fulfilling graduation requirements."

Transfer of Credits

(See also "Admission of Transfer Students," page 15.)

Branch, Community, and Junior Colleges

Seventy-two hours of credits and grades earned for college-parallel courses completed at community colleges or branch colleges in the West Vir-

ginia system of higher education may be applied toward a baccalaureate degree at WVU. Transfer credit for college-parallel courses completed at other community colleges and junior colleges may not exceed 72 hours. Transfer credit from community colleges and junior colleges is normally limited to lower-division courses.

Requirements As to Residence

A student who comes to WVU from another college or university should transfer not later than the beginning of the third year. In no case will a student who matriculates in WVU later than October 1 in any year be permitted to receive a degree at the next Commencement.

In special cases, students who desire to leave WVU at the close of their third year to enter another institution for the purpose of taking a combined course leading to two degrees or of preparing for graduate study, upon application beforehand to the Committee on Academic Standards of the college or school in which they are registered, may be permitted to do the work of the fourth year, or a part thereof, at such other institution and to receive the bachelor's degree from WVU upon presentation of the proper credits.

The transfer student whose undergraduate work has been altogether in institutions within the West Virginia state system of higher education must complete either the last 30 hours of work, or a minimum of 36 hours including 16 of the last 32 hours, in residence. Other transfer students must complete either a total of at least 90 hours or the last 30 hours in residence at WVU. The transfer student may be required to earn up to 15 hours in the major field in residence regardless of the number of hours and the nature of the courses transferred.

Work Done Out of Residence

It is WVU policy to discourage the taking of regular residence courses in absentia. In the case of courses begun at WVU and not completed because of illness or for other acceptable reasons, however, permission to complete the work in absentia under the direction of regular WVU instructors may be granted by the Committee on Academic Standards of the college or school concerned; but in such case credit should be given only upon a report of a grade of no less than C on final examination. This regulation does not apply to WVU off-campus courses.

If the final grade of a student in any course is F, the student must take the course again in residence at WVU if the student desires to receive credit for it, unless the dean of the college or school authorizes the exception.

A student currently enrolled in WVU who wishes to obtain credit toward a WVU degree for courses offered at other institutions should obtain advance approval in writing from the adviser, dean, and the Dean of Admissions and Records. Some courses at some institutions are not directly transferable to WVU credit and, thus, the student runs the risk of losing such credit unless prior approval has been obtained. A student wishing to transfer credit from another institution should also be aware of the "Requirements As to Residence" and the specific degree requirements described elsewhere in this *Catalog*. Transfer credit from institutions outside the West Virginia state system will be accepted only for courses carrying a grade of C or higher when conditions indicated above have been met.

A student who has been suspended for academic deficiencies and who takes courses at other institutions during the period of suspension cannot auto-

matically transfer such credit toward a degree at WVU upon readmission to the University. After one semester of satisfactory performance (C average or better on a minimum of 12 credit hours earned during a regular semester or during the summer sessions) the appropriate transfer credit will be entered into the student's record upon certification by the adviser and dean that the above conditions have been met.

Substitution for Required Courses

A student who desires to substitute another course for any prescribed in the student's curriculum or required for the degree toward which the student is working must obtain permission for such substitution from the Committee on Academic Standards in the student's college or school.

Advanced Placement Credit

West Virginia University encourages students to work to their full capacity and to advance as rapidly as appropriate in their academic work. A number of opportunities are open to both qualified high school juniors and seniors, as well as to adults returning to school after an interval of work or military experience, to demonstrate competence beyond that normally associated with graduation from high school.

High school students who take college-level subjects offered in their schools in cooperation with the College Entrance Examination Board (CEEB) Advanced Placement Program should take the appropriate three-hour examinations administered by the Advanced Placement Service and have the scores sent to WVU. Credit for corresponding WVU courses will be given for high achievement on these tests.

Applicants for admission to the University, especially those who have gained a significant level of maturity through their life experiences, may gain college credit for their educationally related experiences through the College Level Examination Program (CLEP) of the CEEB. Policy of the West Virginia Board of Regents allows University credit to be awarded for successful completion of any or all of the CLEP Subject Examinations, as well as allowing up to 34 hours of general education credit for successful performance on the CLEP General Examinations. Although the program is designed primarily for adults, exceptionally well qualified high school seniors may find it advantageous to seek advanced standing via the CLEP program. Interested applicants may write the Dean of Admissions and Records for further information regarding the CLEP program and WVU credit.

Advanced placement also may be granted for specific military experience. Returning veterans should consult the Dean of Admissions and Records and the WVU Veterans Counselor for details.

After admission to WVU, students may elect to take examinations demonstrating their competence in particular course work. Credit or advanced placement is given for satisfactory completion of the tests. Students interested in challenging courses by examination should consult their advisers for procedures and details.

Credit by Examination

Students actively enrolled in WVU may receive credit for courses by demonstrating competency in the content covered by a particular course. The department responsible for administering the course will determine the

evaluation tools. Where skill and cognitive abilities are components of the course, both will be evaluated. Credit will be given if a satisfactory degree of competency is demonstrated.

A college, school, or department may require students desiring such credit to prepare a self-evaluation statement determining the degree of competency they possess and the methods by which it was achieved.

Students interested in receiving credit for a course by examination should consult the college or school in which the course is offered for procedures and details.

Credit for Correspondence Work

Credit up to a maximum of 30 semester hours for work completed by correspondence in nonlaboratory courses will be accepted by WVU when such work is given by accredited colleges or universities that accept work for credit toward their own degrees and whose residence work is accepted by WVU.

Visitors

Full-time University students may attend classes as visitors, provided they obtain the written permission of their advisers and of the instructors in classes they desire to visit. Members of the administrative or teaching staffs, or other regular employees of the University, may attend classes as visitors provided they obtain written permission of the chairperson of their departments and of the instructors in the classes which they desire to visit.

No credit is given for work in such classes. Such persons may not obtain credit by advanced standing examinations in courses attended as visitors.

Auditors

Students may enroll in courses without working for grade or for credit by registering as auditors and by paying full fees. Change in status from audit to credit or from credit to audit may be made during the registration period. Attendance requirements for auditors shall be determined by the instructor of the course being audited. It is the prerogative of the instructor to strike the name of any auditor from grade report forms and to instruct the Office of Admissions and Records to withdraw the auditor from the class, if attendance requirements are not met.

Summer Session

There are two summer sessions, each of six weeks duration. The first session begins approximately the middle of May and ends June 30. The second session begins July 1, and ends the second week of August. Requirements for admission and character of the work offered are the same for the summer sessions as for the regular academic year.

Credit may be obtained toward the bachelor's, master's, and doctorate. Offerings are varied from summer to summer so that students may complete work for the master's degree by attending summer sessions only.

For complete information, see the *WVU Summer Sessions Bulletin.*

Evening Education

The University offers a program of evening classes for the benefit of those who wish to continue their education beyond the high-school level and who are unable to attend the usual day classes.

All courses are taught by resident faculty members and carry full college residence credit. Many of these courses may be counted toward advanced degrees.

Classification of Students

The following shows the number of semester hours required for classification as second-year, third-year, and fourth-year students:

Freshman Classification..... 1-28 Semester Hours, inclusive
Sophomore Classification..... 29-58 Semester Hours, inclusive
Junior Classification ..... 59-88 Semester Hours, inclusive
Senior Classification..... 89-or More Semester hours, inclusive

Grade-Point Average

All academic units of the University require minimum standards of scholastic quality. Grade points are computed only on grades earned at WVU and at other institutions in the West Virginia state system of higher education. To be eligible for graduation, a student must have a grade-point average of 2.0 (C) or higher on all work for which the student receives grades (except W, WU, and P). In addition, specific degree programs may require minimum grades of C, or in some cases higher than C, in specific courses or portions of the baccalaureate program.

It is the student's responsibility to keep informed of the student's grade-point standing. This information may be obtained at any time from the dean of the college or school in which the student is registered.

Seventy-two hours of credits and grades earned for college-parallel courses completed at community colleges or branch colleges in the West Virginia system of higher education may be applied toward a baccalaureate degree at WVU. Transfer credit for college-parallel courses completed at other community colleges and junior colleges may not exceed 72 hours. Transfer credit from community colleges and junior colleges is normally limited to lower-division courses.

Graduation with Honors

The University recognizes distinguished academic achievement by awarding initial baccalaureate degrees *Summa Cum Laude, Magna Cum Laude,* or *Cum Laude,* to qualified students. The following regulations govern these awards:

1. Grade-point averages for graduation *Summa Cum Laude, Magna Cum Laude,* or *Cum Laude* shall be computed by starting with the student's penultimate semester or summer session and continuing in reverse chronological order until at least 80 semester hours, excluding credits earned with a grade of P or S, have been counted. If, in order to total the required number of hours it is necessary to include any part of a semester or summer session, the work of the whole semester or session shall be included.

2. Students who transfer to WVU may be eligible for graduation with honors based on the computational system stated above.

3. Subject to the above conditions, all candidates for a baccalaureate degree whose grade-point average is 3.80, or higher, shall be graduated *Summa Cum Laude*. Those whose average is lower than 3.8, but equal to or higher than 3.60, shall be graduated *Magna Cum Laude*. Those whose average is lower than 3.60, but equal to or higher than 3.40, shall be graduated *Cum Laude*.

4. Fitting recognition of graduation *Summa Cum Laude*, *Magna Cum Laude*, or *Cum Laude* shall be made on the candidate's diploma and in the Commencement Program.

(This policy will be effective for all students whose first enrollment in an institution of higher education is on or after May 15, 1979.)

Examinations and Reports

Courses

As a rule courses extend through one semester only, although some are of a year's duration. No credit will be given for less than an entire course except by special order of the Committee on Academic Standards. Grades given at the end of the first semester in courses extending throughout the year are merely indicative of the quality of work done by the student to that point and do not give credit for the part of the course so far completed. Such first-semester grades may be considered in determining the final grade, however.

Summer session courses carry the same credit value as courses offered in the regular semesters.

Evaluation of Student Progress

Measurement and evaluation of learning, consistent with the objectives of the course, provide opportunity for the student and the teacher to evaluate progress through a variety of methods. Evaluation by final examination alone is discouraged.

Students are responsible for all material presented or assigned in scheduled instructional sections. Failure to complete all assigned work may result in a report of I or a grade of F at the discretion of the instructor.

Final examinations are held during the last week of each semester of the academic year and during the last two days of each summer session. A listing in the *Schedule of Courses* each semester sets the time for final examinations.

The only tests permitted during the week of classes preceding finals will be in evening classes, practical laboratory tests, make-up examinations, and regularly scheduled short quizzes.

Absence from Examinations

The student is required to take all regular examinations. If a student attends a course throughout the semester and is absent from the final examination without permission, the instructor shall count the examination as zero and report the final grade as F. If, in the opinion of the instructor, absence of the student was for satisfactory reason, the grade of I may be reported.

A student who has been absent because of illness, authorized University activities, or other reasons approved by the student's dean, has the opportunity to make up regularly scheduled examinations.

Grade Reports

In the seventh week of classes of each semester, instructors in all undergraduate courses shall submit a report of students doing unsatisfactory work; that is, earning grades of D or F. These grades are used for counseling and are not recorded on the student's permanent record in the Office of Admissions and Records. These reports are sent to the Dean of Admissions and Records or a representative and this information is transmitted to the student, parent or guardian, adviser, and the dean of the college or school.

Final grades are reported by instructors directly to the Office of Admissions and Records within 48 hours after the closing of the examination. The rule also applies to the final grades of all students registered in other colleges or schools of WVU who are enrolled in law courses.

The final standing of all seniors provisionally approved for graduating at the close of the second semester shall be reported by their instructors to the deans of their colleges and schools, and the final standing of all graduate students provisionally approved for graduation shall be reported to the Dean of the Graduate School. Special report cards are supplied by the Dean of Admissions and Records.

A report of each student's work is made at the close of the semester or summer session to the student or to the student's parents or guardian.

Grading, Absences, Academic Standing, and Withdrawals

Grading System

A — excellent (given only to students of superior ability and attainment)
B — Good (given only to students who are well above average, but not in the highest group)
C — fair (average students)
D — poor but passing
F — failure
I — incomplete
W — withdrawal before the end of the fifth week of a semester or withdrawal doing satisfactory work thereafter
WU — withdrawal doing unsatisfactory work (after the fifth week of a semester)
P — pass (see Pass-Fail Grading below)
X — auditor, no grade and no credit
CR — credit but no grade
PR — progress. Final grade at end of the second semester (Medical Center)
S — Satisfactory
U — Unsatisfactory (equivalent to F)
} in certain approved graduate courses

Pass-Fail Grading

The basic purpose of pass-fail grading for undergraduates at WVU is to promote the undertaking of elective courses unrelated to the student's fields of degree concentration. A secondary purpose of pass-fail grading is to facilitate

student grading in performance or competency based courses which may be an integral part of the student's program.

Student Option. Any full-time student who has completed 15 hours and maintains a 2.00 grade-point average may elect to take a maximum of 4 hours each semester or each summer session in which the grade earned will be either P (pass) or F (fail). The courses taken for pass-fail grading must be free electives and shall not exceed a total of 18 hours credit. Unless otherwise indicated, excluded are courses in the student's major, courses in other subjects that are required by the major, and courses taken to satisfy either University, college, or school requirements. For example, courses elected to satisfy the physical education, English, Core Curriculum, or foreign language requirements may not be taken for pass-fail grading.

The student electing the pass-fail grading option will be graded as a regular student and the appropriate letter grade submitted to the Office of Admissions and Records. The Office of Admissions and Records shall convert the earned letter grade to P-F on the basis of A, B, C, or D for a pass, and F for a fail.

The selection of a course for pass-fail grading must be made at registration and may not be changed after the close of the registration period.

College or School Option. A department or unit may designate any performance or competency based course which, with approval of the college or school and the University Senate, may be offered exclusively as P-F. Such courses offered only as P-F shall not be included in the maximum of 18 hours that may be freely elected under the student option.

(This revised policy became effective as of the beginning of the First Semester, 1977-78, for grading under the *Student Option.)*

Grade Points

The grade-point average is computed on all work for which the student has registered, except for courses with grades of W, WU, P, and X, and is based on the following grade-point values:

A	B	C	D	F	I	U
4	3	2	1	0	0	0

Provided, however, that when a student receives a grade of I and later removes the incomplete grade, the average grade-point standing shall be calculated on the basis of the new grade.

If the final grade of a student in any course is F, the student must take the course again in residence at WVU if the student desires to receive credit for it, unless the dean of the college or school authorizes the exception. The grade of I is given when an instructor believes that the course work is unavoidably incomplete or that a supplementary examination is justifiable. The grade of I must be removed within the following semester or the next semester in which the student is in residence, and becomes a failure unless special permission is granted by the appropriate Committee on Academic Standards to postpone removal.

For teacher certification the student is responsible for every registration in a course for which a grade of A, B, C, D, F, WU, P, or I is received.

Absences

Students who are absent from class for any reason are responsible for work missed.

Students should understand that absences may jeopardize their grades or continuance in the course.

Instructors who use absence records in the determination of grades must announce this fact to students (in writing) within the first five class meetings.

It is the responsibility of the instructor to keep an accurate record of all students enrolled.

Instructors may report excessive absences to the student's dean or adviser.

Students who have been absent because of illness, authorized University activities, or other reasons approved by their deans, have the opportunity to make up regularly scheduled examinations.

Withdrawals

Withdrawal from Class

Until the Friday of the tenth week of classes (or, in the case of summer school, until two-thirds through the session), students may withdraw from part of their course work by obtaining their advisers' signatures on the University course withdrawal form and submitting the completed form to the Office of Admissions and Records. A deadline will be printed in the University Calendar each semester. No withdrawal will be permitted after the deadline.

Students are responsible for determining (with their advisers' help):

1. Whether their course load is reduced below the minimum requirements set by their college;
2. Whether their course load is reduced below the minimum number of hours required for financial aid or athletic eligibility;
3. Whether the course dropped is required to fulfill academic probation conditions;
4. Whether the course dropped is corequisite or prerequisite to another course the student is taking or a prerequisite to a course required by the student's curriculum the following term.

A student who withdraws before the established deadline shall receive a grade of W.

Withdrawal from University

A student who desires to withdraw from WVU must obtain a withdrawal form from the Office of Student Educational Services (or dean's office of an off-campus instructional unit). Withdrawal procedure will be explained at that time. A student may withdraw from the University only before the last day of regular classes as established by the University Calendar.

A student who desires to leave WVU must officially withdraw in accordance with this policy. The student who fails to follow the established policy may incur severe penalties (e.g., a grade of F in each course for which the student is registered and/or suspension from the University).

It is the student's responsibility to see that all financial obligations are met and that all forms required for withdrawal from the University are properly executed and delivered to the appropriate authorities. The withdrawal becomes official only after the appropriate forms have been recorded by the Dean of Admissions and Records.

Re-Enrollment After Withdrawal

An undergraduate student who withdraws from WVU in two consecutive semesters (excluding summer session) may not register for further work without approval of the dean of the college or school in which the student wishes to register and subject to conditions set by that dean.

Advisers, Committee on Academic Standards

Advisers

Each student entering WVU is assigned an adviser whose duty is to assist students in preparing schedules, assign them to classes, and certify their study lists to the Dean of Admissions and Records. The adviser is expected to give such advice and sympathetic guidance as the students may need in their work at the University. Students are expected to go freely to their advisers to discuss problems.

Advisers, upon receipt of reports of excessive numbers of absences, shall have conferences with the student concerned and shall make such recommendations and adjustments as are desirable and feasible. If the adviser does not find a satisfactory solution after a conference with the student, the case shall be reported to the dean of the college or school.

Committee on Academic Standards

The Committee on Academic Standards of each college or school shall have authority to proceed according to its best judgment in regard to students referred to it for consideration.

All orders of the committee shall become effective when approved by the dean of the college or school.

In exercising its authority the committee shall not suspend a student during a semester except for willful neglect and in cases where the student's class grades are so low that further class attendance would be a waste of time. No suspension shall become effective until approved by the dean of the college or school.

Uniform Academic Suspension Regulations

Any undergraduate student in a baccalaureate curriculum whose total grade-point average is less than 2.0 but whose total grade-point deficiency is not large enough to cause suspension, will be notified on the student's grade report from the Dean of Admissions and Records that the student's academic performance is unsatisfactory. Any further action or restriction is entirely the prerogative of the individual college or school.

Any undergraduate student in a baccalaureate curriculum with a grade-point deficiency which exceeds the maximum allowed by the uniform University regulation (see Table, page 42) shall be subject to academic suspension by the dean of the college or school.

Academic suspension identifies the status of a student who has failed to meet the University minimum standards and who has been notified formally by the dean of the college or school of academic suspension. A suspended student may not register for further work without prior approval of readmission by the Committee on Academic standards and the dean of the college or

school. Action on academic suspension is to be taken by the appropriate dean at the end of each semester and such action is to be based on a special report from the Dean of Admissions and Records. The sequence of events in bringing about this action is:

1. The Dean of Admissions and Records will forward a special report at grade-reporting time to the college or school deans for appropriate action.

2. The Dean of Admissions and Records will provide the Vice President and Provost for Academic Affairs with a list of sutdents subject to suspension in each college or school.

3. Deans will report to the Vice President and Provost for Academic Affairs the action on the students reported to them for academic suspension by the Dean of Admissions and Records.

4. A dean may suspend a student who fails to meet the requirements of academic probation set by the Committee on Academic Standards of the student's college or school.

Students who have been suspended may petition the Committee on Academic Standards of the college of enrollment after the next March 1st or October 1st to ascertain under what conditions, if any, they may be readmitted to that college.

A student suspended for academic reasons who fails to gain readmission to the college or school of the student's choice shall, upon application, be readmitted after one calendar year from the date of suspension, as a Remedial Study student in the College of Arts and Sciences. A Remedial Study student enrolls under special probationary rules that require a 2.0 grade-point average in each semester of enrollment. As a Remedial Study student, the student is not liable to suspension because of cumulative grade-point deficiencies. A student may, after successfully bringing the cumulative grade-point average up to 2.0, petition to have the work completed as a Remedial Study student apply toward the completion of degree requirements as may be appropriate.

Suspension by these procedures shall be termed academic suspension and the above regulations supersede all other regulations for academic suspension.

MAXIMUM ALLOWABLE GRADE-POINT DEFICIENCY*

Total Hours Attempted	*Maximum Grade-Point Deficiency*	*Total Hours Attempted*	*Maximum Grade-Point Deficiency*
0-20	32	61-65	12
21-25	26	66-70	12
26-30	20	71-75	11
31-35	19	76-80	10
36-40	18	81-85	9
41-45	17	86-90	8
46-50	16	91-95	7
51-55	15	96 and above	6
56-60	14		

*The grade-point deficiency is the difference between the number of grade points needed for a 2.00 average and the number of grade points that a student has actually earned in all courses attempted.

Cheating

Procedural Rules for Handling Cheating Cases

Cheating is condemned at all levels and in all areas of life. Like a crippling malady, it leaves its mark subjectively. Cheating indicates a weakness and inability to meet and face the issues and problems of life. It creates an atmosphere of mistrust, disrespect, and insecurity. The effects and influence of cheating will necessarily be reflected in commerce and government and in all of the professions and callings, as well as in the classroom and in the home. Students at WVU should act to discourage and eliminate cheating of every kind and character for the moral and mental well-being of themselves and their fellow students. Likewise, the teaching faculty should remove and eliminate every situation which provides avenues and opportunities for cheating, thereby contributing to the inculcation of the principles of honesty, integrity, self-reliance, and self-respect in students. It is expected that University officials will have little occasion to place in operation the established procedures for handling cheating cases. Through these procedures and by means of a continued awareness, on the part of both faculty and students, of the intellectually and morally weakening effects of cheating, a healthy strengthening of the moral fiber of the University may be envisioned and accomplished.

Cheating may be defined as including:

1. Obtaining help from another student during examination.
2. Knowingly giving help to another student during examination.
3. The use of notes, books, or any other unauthorized sources of information during examination.
4. Obtaining, without authorization, an examination or any parts thereof before taking the examination.
5. Submitting a report, notebook, speech, outline, theme, or other problem for credit that has been knowingly obtained or copied in whole or in part from another individual's academic composition, compilation, or other product.
6. Submitting or participating in the submission of a report or examination paper falsely represented as being the result of the original efforts of the submitting student. (Plagiarism is a serious offense in whatever form it may appear, be it the submission of an entire article falsely represented as the student's own, the inclusion within a piece of the student's writing of an idea for which the student has not provided sufficient documentation, or the inclusion of a documented idea not sufficiently assimilated into the student's language and style. A student who has any questions about whether a particular inclusion in the student's work might constitute plagiarism should take the responsibility of requesting the aid and clarification of the instructor to whom the student is submitting the work.)
7. Altering the record of any grade in any gradebook, office, or other record.
8. Any other type of misconduct, offense, or manisfestation of dishonesty or unfairness in or relating to academic work.

The deans of the several colleges and schools shall have the authority and shall be responsible for the handling of cheating cases arising or occurring within their respective colleges or schools. (Instructors of graduate students charged with cheating should follow the procedures outlined in the *Graduate School Catalog*.)

Each member of the teaching faculty and all other WVU employees, including but not limited to assistants, proctors, office personnel, custodians and

security officers, shall promptly report, via the department chairperson or immediate superior, if any, each known case of cheating, as hereinbefore defined, to the dean of the college or school concerned.

Each case of cheating shall be handled with dispatch, and the dean shall promptly report thereon in writing to the President of WVU and shall at the same time place a copy of such report in the permanent record of the student concerned and forward another copy thereof to the Dean of Student Educational Services for the student's permanent records. The report shall include a brief statement covering the facts and circumstances of the case and the discipline applied or recommended.

In cases wherein cheating occurs in a college or school other than that in which the student is registered, the minimum penalty, as prescribed in the paragraph below, shall be applied by the dean of the college or school in which the cheating occurred. In handling such cases the dean shall follow the procedure in the above paragraph and then immediately refer the case, by transmittal of a copy of the report thereon as prescribed in the above paragraph, to the dean of the college or school in which the student involved is registered. The purpose of this copy of the report is for information and for imposition or recommendation of such further discipline or penalty as may be warranted. Upon completion of a review of and action on the case, the dean of the college or school in which the student is registered shall thereupon compose an independent written report on the case and transmit same to the President of WVU and otherwise distribute copies thereof as provided in the above paragraph.

The deans and their respective teaching faculties shall take remedial and preventive steps to remove every opportunity for any situation conducive to cheating. Particular attention shall be given to the maintenance of a high level of proctoring in those colleges, schools, and departments wherein proctoring is employed and to security against student access to or knowledge of examination and test materials before the time of the intended use thereof for student examination and testing purposes. The deans shall exercise their independent discretion as to methods and means of accomplishing these ends and may employ therefor faculty meetings, written instructions, or other effective devices and measures.

The *minimum* penalty for all cases of cheating shall be dismissal from the course and the establishment of a grade of F in the course, as of the date of cheating, *unless in the opinion of the dean there are extenuating circumstances which might indicate the advisability of a lesser penalty.* Where the grade of F in the course involved is a part of the penalty for cheating, that grade is to be entered on the student's permanent record and to remain there even though the student withdraws from the course or from WVU.

For a second or subsequent cheating offense, in addition to failure in the course, suspension or expulsion of the student shall be recommended by the dean for the President's action. The office of the Dean of Student Educational Services shall maintain its records of reports in cheating cases so as to detect and ascertain promptly and accurately the occurrence of second or subsequent cheating offenses and, upon inquiry by the dean, shall promptly advise whether the student has been guilty of any prior cheating offense or offenses.

Suspension or expulsion of a student guilty of cheating may, in first offense cases, be recommended by the dean to the President if the facts and circumstances of the case so warrant or the rules, regulations, or policy of the college or school concerned so require.

In cheating cases involving criminal offenses, such as theft of examination or test materials, alteration of records, breaking or entering buildings, offices,

desks, safes, or filing cabinets, damage to public property and other like or similar misconduct, the academic penalties and discipline as herein prescribed shall be applied and in addition thereto the dean of the college or school concerned shall, with the approval of the President of WVU, cause the facts of each case to be presented to the Prosecuting Attorney of Monongalia County, West Virginia, for further investigation and for prosecution by injunction or otherwise as may be warranted. Upon the issuance of a warrant for or the return of an indictment against a student on account of any such offense, the President shall suspend such student from WVU pending final prosecution thereon. If the student is acquitted of the offense, the student's suspension may be vacated, but if convicted of the offense, the student shall be expelled from WVU.

A student may appeal the decision or action of a dean in a cheating case to the President for review and reconsideration and the President may thereupon affirm or reverse, in whole, or in part, the decision or action of a dean.

In action on any cheating case, whether on appeal by a student or on recommendation or reference by a dean, the President may consider the case record, may further investigate or cause to be investigated the facts and circumstances of the case, and may act personally thereon and dispose thereof, or the President may, in his discretion, refer the case to another appropriate University office, committee, or agency for review, investigation, consideration, and recommendation before final action thereon and disposition thereof.

It is recommended that, in all phases of cheating cases, care and caution be observed so as to avoid accusation or charge of cheating or related impropriety which may be without foundation. A false accusation may have serious implications and result in reflection on or harm to an innocent and unoffending student and discredit to the faculty.

Part 3

CURRICULA AND COURSES

Plan for Numbering Courses

For convenience, each course of study is designated by the name of the department in which it is given and by the number of that course. The plan for numbering is as follows:

Courses 1 to 99 — Courses intended primarily for freshmen and sophomores.
Courses 100 to 199 — Courses intended primarily for juniors and seniors.
Courses 200 to 299 — Courses for advanced undergraduate students and selected graduate students. No more than 40 percent of the credits counted for meeting requirements for a graduate degree can be at the 200 level.
Courses 300 to 399 — Courses for graduate students; students in professional programs leading to the doctorate; and selected, advanced undergraduates. Undergraduates in any class carrying a 300 course number should have a 3.0 cumulative grade-point average and have written approval on special forms from their instructor and adviser and the Graduate School Dean. Seniors within 12 semester hours of graduation may, with prior approval on special senior petition forms of their adviser and Graduate School Dean, enroll in 300-level graduate courses. (In summary, 200-level courses are intended primarily to serve undergraduate students; 300-level courses are intended primarily to serve introductory graduate and master's degree course needs.)
Courses 400 to 499 — Courses for graduate students only. All doctor's degree dissertation hours shall be awarded at the 400 level — specifically under course number 497.

Graduate degree credit hour requirements must include at least 60 percent at the 400 and 300 level.

Abbreviations in Course Listings

I	— a course given in the first semester
II	— a course given in the second semester
I, II	— a course given in each semester
I and II	— a course given throughout the year
Yr.	— a course continued through two semesters
S.	— a course given in the summer
hr.	— credit hours per course
rec.	— recitation period
lab.	— laboratory period
lec.	— lecture period
Conc.	— concurrent registration required
PR	— prerequisite
consent	— consent of instructor required
CR	— credit but no grade

Schedule of Courses

Before the opening of each semester, a *Schedule of Courses* is printed announcing the courses that will be offered by the colleges and schools of WVU.

Note

Courses in this *Catalog* are subject to change without notice.

College of Agriculture and Forestry

Dale W. Zinn, Ph.D., *Dean of College of Agriculture and Forestry; Director of Agricultural and Forestry Experiment Station; Professor of Animal Science.*
Alfred L. Barr, Ph.D., *Chairman of Division of Animal and Veterinary Sciences; Professor of Agricultural Economics.*
M. E. Gallegly, Ph.D., *Chairman of Division of Plant Sciences; Professor of Plant Pathology.*
Dale Colyer, Ph.D., *Acting Chairman of Division of Resource Management; Professor of Agricultural Economics.*
Wallace W. Christensen, Ph.D., *Chairman of Division of Forestry; Professor of Forest Economics.*
P. Vernon Armbrester, M.S., *Associate Dean for Academic Programs; Associate Professor of Agricultural Education.*
Edwin C. Townsend, Ph.D., *Associate Director of Agricultural and Forestry Experiment Station; Associate Professor of Statistics.*

The College of Agriculture and Forestry is divided into four divisions of study — Animal and Veterinary Sciences, Forestry, Plant Sciences, and Resource Management. The college's faculty and staff are located in three major buildings on the Evansdale Campus and on four Morgantown area farms and one nearby forest.

Students enrolling in the college are offered a variety of fields of study which complement various careers. Emphasis can be placed on studying the biological sciences, animals, plants, trees or soils; or emphasis might be on the social sciences related to resource management or recreation, or on the artistic development of landscapes.

In short, the college and its curricula stress applied ecology, which deals with the relationship of living organisms to their environments. The student of agriculture and forestry studies many different subjects concerned with plants, animals and microbes that interrelate with and affect our environment. The study of ecology, then, is interwoven throughout the courses offered in the college, to give the student a comprehensive understanding of the basic elements at work in our environment.

Such emphasis on ecology is designed to give students the education necessary for careers emphasizing the protection of environmental quality and the management, utilization, and conservation of our soil, water, forests, wildlife, domestic animals, our food and our fiber.

The college, too, is site of the state's Agricultural and Forestry Experiment Station, so the University maintains extensive land for research purposes. This land is divided into areas devoted to dairy, livestock, poultry, forestry, wildlife, horticulture, agronomy, and soils. Students and professors use these areas regularly for instruction and research, and information gathered at these holdings is used to update subject matter in the classroom.

Degrees and Curricula

The College of Agriculture and Forestry offers five baccalaureate degrees and eleven curricula in which students may major. Those degrees and curricula are:

Bachelor of Science (B.S.)
- Animal and Veterinary Sciences Curriculum
- Resource Management Curriculum
- Wildlife Resources Curriculum

Bachelor of Science in Agriculture (B.S.Agr.)
- Animal and Veterinary Science Curriculum
- Plant and Soil Science Curriculum
- Resource Management Curriculum
- Agricultural Education Curriculum

Bachelor of Science in Forestry (B.S.F.)
- Forest Resources Management Curriculum
- Wood Industries Curriculum

Bachelor of Science in Landscape Architecture (B.S.L.A.)
- Landscape Architecture Curriculum

Bachelor of Science in Recreation (B.S.R.)
- Recreation Curriculum

Admission

Students may be considered for admission to WVU on the basis of graduation and transcripts from accredited high schools. High school graduates are required to present credit for 4 units of English and 1 unit of algebra. In addition, agriculture and forestry require 1 unit of geometry.

Students who wish to major in areas of animal sciences, plant sciences, or resource management are admitted directly into the College of Agriculture and Forestry.

Students desiring admission to the Landscape Architecture program should check admission requirements with the Associate Dean's office of the College or the WVU Office of Admissions and Records.

Students seeking admission to one of the curricula in Forestry must have earned 30 hours of specified college credit. (See Forestry section for entrance requirements.)

Complete information concerning WVU admissions, registration, fees and expenses, and regulations, may be obtained in Part 2 of the *Undergraduate Catalog*.

Transfer Credits

Students transferring into the College of Agriculture and Forestry from one or two-year technical programs or from unaccredited programs, must take examinations to demonstrate proficiency for any course offered by this College for which transfer credit is sought. In addition, the Forestry Division applies this rule to dendrology and surveying. All other credits are accepted subject to the regulations of the Office of Admissions and Records.

College Regulations

Students in the College of Agriculture and Forestry must comply with University regulations dealing with scholarship. Specific regulations that apply to the College are described in the following sections.

Credit Load Per Semester

The minimum work per semester is 14 credit hours and the maximum work per semester is 20 hours. Exceptions to this regulation are:

A student in the student's first semester of enrollment or students on academic probation or academic warning may reduce the course load to 12 semester hours with the approval of the adviser.

An adviser may register a student as a part-time student if less than 14 hours are required to meet all requirements for the bachelor's degree.

Any exceptions to these regulations may be requested by petitioning the Committee on Academic Standards.

Student Petitions

Petitions may be submitted to the Committee on Academic Standards: (a) to register for more than maximum hours regularly allowed; (b) to register for less than minimum load; (c) to drop courses after the regular withdrawal date; (d) for reentry after scholastic suspension, and (e) to transfer into the College with a grade-point deficiency accumulated in another college.

Petitions should be prepared on special forms and must include the recommendation of the student's adviser.

Barring unusual and unforeseen circumstances, a student is under obligation to complete the courses in which registration was made. Low grades in a course do not constitute a reason for withdrawal.

Students may appear in person before the Committee on Academic Standards in support of their petitions.

Students may appeal decisions of their advisers, Committee on Academic Standards, and division chairpersons to the Associate Dean.

Students should submit petitions as soon as a problem becomes evident. Delay may result in lack of approval because of insufficient time for action.

Notice of the recommendation by the Committee on Academic Standards regarding a petition, after approval by the Associate Dean, shall be sent to the student, to the adviser, and the chairperson of the division in order that the report can be filed with the student's scholastic records.

Add-Drop Procedure

A student may drop part of the class work during the first or second semester, at any time following registration until the end of the fifth week after the first day of classes. The student must have the adviser's approval only in this situation, provided the student does not fall below the College minimum for a full-time student.

In order to drop a course after the fifth week of classes and 18 days before the last day of classes (second week of longer summer sessions; first week of shorter summer sessions), a student must submit a petition to drop a course.

The student will obtain an add-drop petition in the Associate Dean's office and deliver it to the adviser properly completed and signed. The adviser will forward the petition (by mail) to the Chairperson of the Committee on Academic Standards. The student will be notified by the Associate Dean's office of the decision.

Applications for Graduation

A student currently enrolled in the College of Agriculture and Forestry who wishes to obtain credit toward a College of Agriculture and Forestry degree offered at another institution should obtain advanced approval in writing from the adviser, academic dean, and the Dean of Admissions and Records. Some courses at other institutions are not directly transferable to College of

Agriculture and Forestry credit and a student runs the risk of losing credit from another institution unless prior approval has been obtained. Advisers are requested not to approve students taking work at other institutions unless the *Undergraduate Transient Application* is accompanied by a course description.

All candidates for the bachelor's degree in the College must fill out an application for graduation in Room 1006 of the Agricultural Sciences Building at the beginning of the semester in which they expect to receive their degree.

Grade-Point Deficiencies

Academic Warning

A student with a grade-point deficiency which is not so large as to cause suspension shall be placed on academic warning. The student shall be advised in writing of the academic status by the Associate Dean. Copies of the letter shall be sent to the student's parent or guardian, the adviser, the chairperson, and the official file of the student.

A student with a grade-point deficiency shall not enroll for more than 15 hours.

Academic Probation

Students who have been reinstated after suspension and students who have transferred from another college with less than a 2.0 grade-point average shall be placed on academic probation until the grade-point deficiency is reduced to a level less than the maximum allowable without suspension. At such time the student will be reassigned to an adviser by the appropriate division chairperson.

While on academic probation a student shall be required to maintain a minimum grade-point average of 2.25 in order not to be suspended.

The Associate Dean's office shall serve as adviser to all students on academic probation.

Academic Suspension

Any student whose grade-point deficiency exceeds the maximum allowed by these regulations shall be subject to suspension. The student shall be notified of suspension in writing by the Associate Dean. Copies of the letter shall be sent to the Dean of Admissions and Records, Director of Residence Halls, the appropriate division chairperson, the student's parent or guardian, the adviser, and the official file of the student.

Any student on academic probation whose grade-point average at the end of a period of enrollment is less than 2.25 for that period of enrollment shall be suspended. Letters of notification shall be distributed as described above.

Students who have been suspended are advised to petition the Committee on Academic Standards after March 1 or October 1 to ascertain under what conditions, if any, they may be reinstated.

A student suspended for academic reasons who fails to gain readmission to the college of the student's choice shall, upon application, be readmitted after one calendar year from the date of suspension, as a Remedial Study student in the College of Arts and Sciences.

Courses and Programs

Agriculture (Agr.)

11. *Professions in Agriculture.* I. 1 hr. Survey of the subject-matter disciplines available to agriculture graduates. Study of all the dimensions of the industry of agriculture.

12. *Professions in Agriculture.* II. 1 hr. Continuation of Agr. 11.

200 *Agriculture Travel Course.* S. 6 hr. Tour and study of production methods in major livestock and crop regions of the United States and other countries. Influence of population, climate, soil, topography, markets, labor, and other factors on agriculture production.

Agriculture and Forestry (Agr. & For.)

190 *Professional Development.* I, II, S. 1 hr. per sem. PR: Cooperative education commitment. Evaluation of cooperative education experience in an independent work-study program.

295. *Professional Field Experience.* I, II, S. 1-12 hr. PR: Division approval of planned program. Junior or senior standing recommended. Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty ard field supervisors. Involves temporary placement with public or private enterprise for professional competency development. (*Pass/Fail grading.)*

Agricultural Biochemistry

Interdivisional Committee of Agricultural Biochemistry

A. L. Barr, Ph.D. (Okla. St. U.), *Co-Chairman, Agricultural Biochemistry.*
M. E. Gallegly, Ph.D. (U. Wisc.), *Co-Chairman, Agricultural Biochemistry.*
Bradford C. Bearce, Ph.D. (U. Cal.), *Professor of Horticulture and Agricultural Biochemistry and Horticulturist.*
James L. Brooks, Ph.D. (U. Cal.), *Associate Professor of Agricultural Biochemistry and Associate Agricultural Biochemist.*
L. Morris Ingle, Ph.D. (Purdue U.), *Professor of Horticulture and Plant Biochemistry and Horticulturist.*
Walter J. Kaczmarczyk, Ph.D. (Hahnemann Med. C.),*Professor of Genetics and Agricultural Biochemistry and Associate Geneticist.*
George A. McLaren, Ph.D. (Okla. St. U.), *Professor Emeritus of Agricultural Biochemistry.*
William G. Martin, Ph.D. (WVU), *Professor of Agricultural Biochemistry and Agricultural Biochemist.*
Robert L. Reid, Ph.D. (Aberdeen U.), *Professor of Animal Nutrition and Agricultural Biochemistry and Nutritionist.*
David A. Stelzig, Ph.D. (N.D. St. U.), *Professor of Agricultural Biochemistry and Agricultural Biochemist.*
Valentin Ulrich, Ph.D. (Rutgers U.), *Professor of Genetics and Agricultural Biochemistry and Geneticist.*

Agricultural Biochemistry (Ag. Bi.)

180 *Assigned Topics.* I, II. 1-4 hr. In order to be eligible to register in Assigned Topics, the student must: (1) be in good standing, and (2) obtain approval of the Division before registration.

210. *Introductory Biochemistry.* I, II. 3 hr. PR: Two semesters of general chemistry and one semester of organic chemistry. The biochemistry of the proteins, carbohydrates, lipids, nucleic acids, enzymes, coenzymes, and cellular metabolism in plants and animals.

212. *Nutritional Biochemistry.* II. 3 hr. PR: Ag. Bi. 210 or consent. Nutritional biochemistry of domestic animals.

310. *General Biochemistry.* I. 3 hr. PR: 8 hr. Organic chemistry. A general course in biochemistry primarily intended to meet the needs of graduate students.

311. *Laboratory Experiments in Biochemistry.* I. 2 hr. PR: Ag. Bi. 310 or concurrent enrollment. Experiments to demonstrate some of the basic tools and procedures of biochemical research.

312. *General Biochemistry.* II. 3 hr. PR: Ag. Bi. 310 or consent. Continuation of Ag. Bi. 310.

314. *Radionuclide Biochemistry.* II. 3 hr. PR: Chem. 1, 2, 131, or consent. Radionuclide methods and isotope handling as needed by students interested in biological research. *(Course will not be offered in 1979-80.)*

318. *Amino Acid Biochemistry.* I. 2 hr. PR: Ag. Bi. 312, or consent. Properties, reactions, biosynthesis and intermediary metabolism of amino acids.

Division of Animal and Veterinary Sciences

Faculty

Alfred L. Barr, Ph.D. (Okla St. U.), *Chairman, Division of Animal and Veterinary Sciences and Professor of Agricultural Economics and Agricultural Economist.*

Gerald C. Anderson, Ph.D. (U. Mo.), *Professor of Animal Science and Animal Husbandman.*

C. Jett Cunningham, Sr., B.S. (VPI), *Professor Emeritus of Animal Science.*

Robert A. Dailey, Ph.D. (U. Wisc.), *Assistant Professor of Animal Science and Assistant Animal Scientist.*

Leslie Dozsa, D.V.M. (C. Vet. Med., Budapest), *Professor of Veterinary Science and Animal Pathologist.*

Robert S. Dunbar, Jr., Ph.D. (Cornell U.), *Professor of Animal Science and Animal Scientist.*

J. R. Escoubas, Ph.D. (Okla. St. U.), *Assistant Professor of Animal Science and Assistant Animal Scientist.*

Rush C. Hatch, B.S., (WVU), *Dairy and Livestock Farm Superintendent.*

Danny Hooge, Ph.D. (Tex. A&M U.), *Assistant Professor and State Extension Specialist — Poultry Science.*

William Hoover, Ph.D. (Penn St. U.), *Professor of Dairy Science and Dairy Scientist.*

Donald J. Horvath, Ph.D. (Cornell U.), *Professor of Animal Science and Animal Husbandman.*

D. A. Hutchison, M.S. (WVU), *Associate Professor and State Extension Specialist.*

E. Keith Inskeep, Ph.D. (U. Wisc), *Professor of Animal Science and Animal Scientist.*

Robert James, Ph.D. (VPI & StU), *Assistant Professor of Dairy Science and State Extension Specialist — Dairy Science.*

William T. Jones, M.S. (WVU), *Poultry Farm Superintendent.*

Robert O. Kelley, Ph.D. (U. Mo.), *Professor and State Extension Specialist — Dairy Science.*

Harold E. Kidder, Ph.D. (U. Wisc.), *Professor of Animal Science and Animal Husbandman.*

Paul E. Lewis, Ph.D. (WVU) *Associate Professor of Animal Science and Associate Animal Husbandman.*

Marvin R. McClung, Ph.D. (Iowa St. U.), *Professor of Animal Science and Animal Scientist.*

George A. McLaren, Ph.D. (Okla. St. U.), *Professor Emeritus of Agricultural Biochemistry.*

William G. Martin, Ph.D. (WVU), *Professor of Agricultural Biochemistry and Agricultural Biochemist.*

Norman O. Olson, D.V.M. (Wash. St. U.), *Professor of Veterinary Science and Veterinarian.*

John B. Peters, Ph.D. (U. Wisc.), *Associate Professor of Animal Science; Associate Animal Scientist and State Extension Specialist.*
Ronald A. Peterson, Ph.D. (Mich. St. U.), *Associate Professor of Poultry Science and Associate Poultry Scientist.*
Edward C. Prigge, Ph.D. (U. Maine), *Assistant Professor of Animal Science and Assistant Animal Scientist.*
Robert L. Reid, Ph.D. (Aberdeen U.), *Professor of Animal Science and Nutritionist.*
Paul M. Smith, M.S. (Penn. St. U.), *Assistant Professor and Supervisor of Dairy Processing.*
Roy O. Thomas, Ph.D. (Mich. St. U.), *Associate Professor of Dairy Science and Dairy Scientist.*
A. H. VanLandingham, Ph.D. (WVU), *Professor Emeritus of Agricultural Biochemistry.*
Benjamin W. Wamsley, Jr., M.S. (WVU), *Professor and State Extension Specialist — Animal Science.*
James A. Welch, Ph.D. (U. Ill.), *Professor of Animal Science and Animal Husbandman.*
Frank E. Woodson, D.V.M. (Ohio St. U.) *Professor of Veterinary Science and Veterinarian.*
Dale W. Zinn, Ph.D. (U. Mo.), *Dean of College of Agriculture and Forestry and Professor of Animal Science.*

Programs of Study

Students taking programs in this division may work towards degrees which enable them to do graduate work, go into commercial agriculture, work for federal or state agencies, the food processing industry, and other areas of food and agriculture. The program in Pre-Veterinary Medicine provides requirements for entry into veterinary colleges. Many pre-veterinary students obtain their bachelor degrees when meeting veterinary school requirements.

Students enrolled in programs in the division take courses in breeding, nutrition, pathology, food science, and animal production. To assist in equipping themselves for the many varied careers in animal agriculture, students take supporting courses in other divisions of the College of Agriculture and Forestry and in other colleges. These include courses such as agricultural biochemistry, mathematics, chemistry, biology, finance, business law, and accounting. The programs are flexible enough to permit the student to obtain a broad background and take enough courses in an area the last two years to prepare for the first job.

Bachelor of Science

ANIMAL AND VETERINARY SCIENCES CURRICULUM

The curriculum in science, with its flexible design, will provide the student with the opportunity to acquire the necessary background in agricultural biochemistry, mathematics, chemistry, physics, and modern concepts of biology in preparation for professional schools of veterinary medicine, human medicine, dentistry, and law, or graduate study in such fields as agricultural biochemistry, animal breeding, animal physiology, nutrition, and pathology. Selection of individual courses is the responsibility of the student in consultation with an adviser.

Curriculum Requirements	*Hours*
English Composition and Rhetoric (or conformity with WVU English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C included)	40
(A minimum of two courses in each of biology, chemistry, physics, and calculus is required. The pre-professional student may substitute advanced chemistry courses for calculus to meet degree requirements. This ordinarily means organic chemistry and biochemistry.)	
Courses in the College of Agriculture and Forestry	24
Physical Education	2
Free Electives	32
Total	128

Bachelor of Science in Agriculture

ANIMAL AND VETERINARY SCIENCES CURRICULUM

The curriculum of Bachelor of Science in Agriculture will provide the student with the opportunity to acquire the necessary background in biochemistry, nutrition, breeding, physiology, pathology, agricultural economics, and agronomy to become prepared for a career in animal, dairy, or poultry production and management. There also are food science courses available under the curriculum for those students who are interested in preparing for opportunities in food processing related to dairy, poultry, and meat products.

Curriculum Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C included)	24
(Must elect a minimum of 8 credits in biology; 8 credits in chemistry; 3 credits in college algebra or equivalent.)	
Courses in Agriculture	45
Elect a minimum of 3 credits in each of the following:	
1. Animal Science 3. Soil Science	
2. Plant Science 4. Agricultural Economics*	
Elect additional courses to obtain a total of 45 credits in Agriculture.	
Physical Education	2
Free Electives	35
Total	136

*Either Economics 51 or 54 is a prerequisite for all courses in Agricultural Economics numbered 100 or above.

Pre-Veterinary Medicine Program

This program is designed to provide students with the academic requirements for entry into professional schools or colleges of veterinary medicine. West Virginia has agreements with Ohio State University and with the Southern Regional Education Board whereby each year up to six students may be accepted by Ohio State University and up to ten may be placed through the Southern Regional Education Board. In order to qualify for these positions the students must have been West Virginia residents for at least the past five years

at the time of application. Students may apply to any of the other veterinary schools in the United States and Canada for admission.

Applicants for admission to these colleges of veterinary medicine must present at least 69 semester hours of acceptable credit. Since a maximum of sixteen eligible students are accepted each year, alternate goals in either of the other degree programs are urged for all pre-professional students.

Applicants with a grade-point average of 3.0 or above will be given first consideration for admission to these institutions.

A student who has completed 90 hours of course work at WVU, or 90 hours at institutions within the West Virginia state system of higher education, including at least 36 at WVU, and has completed all required courses for the degree may transfer credit from a veterinary college to WVU and receive the bachelor's degree.

The *equivalent* of the following pre-professional courses currently meet requirements for contract colleges of veterinary medicine.

Curriculum Requirements	*Hours*
Agricultural Orientation	2
Animal Nutrition	3
Biochemistry	3
Biology	8
Business English	3
Chemistry (Inorganic)	8
Chemistry (Organic)	8
Economics and Agricultural Economics	6
English	6
Mathematics	6
Microbiology	4
Physics	8
Principles of Heredity	4
Speech Communication	3
Total	72*

*Students are urged to consult their advisers for current requirements of individual veterinary colleges.

Courses of Instruction

Animal and Veterinary Science (A&VS)

51. *Principles of Animal Science.* I. 4 hr. (1 lab.). A comparative study of the production of meat, milk, eggs, and wool. Nutrition, physiology, genetics, hygiene and physical environment, and economics are discussed as bases for sound managerial decisions.

180. *Assigned Topics.* I, II, S. 1-4 hr. per. sem. In order to be eligible to register in Assigned Topics 180, the student must: (1) be in good standing, and (2) obtain approval of the Division Director before registration.

195. *Seminar.* II. 1 hr. Senior seminar.

Animal Nutrition (An. Nu.)

101. *Animal Nutrition.* I, II. 3 hr. PR: Two courses in chemistry. Digestion and metabolism of food nutrients, nutrient requirements of farm animals, and nutritive values of feeds and rations.

294. *Poultry Nutrition.* II. 3 hr. PR: An. Nu. 101. Nutritional requirements, interrelationships, and deficiencies of all types of domesticated fowl.

301. *Principles of Nutrition and Metabolsim.* I. 3 hr. PR: Ag. Bi. 210 or consent. A basic course in principles of nutrition with emphasis on the major classes of dietary nutrients and their digestion and utilization.

302. *Nutrition and Physiological Function.* II. 3 hr. PR: An. Nu. 301 or consent. Sequence to Principles of Nutrition and Metabolism. Techniques used in nutritional studies and the relationship of nutrient requirements to physiological function in species of laboratory and domestic animals and man.

304. *Nutrition Laboratory Methods.* II. 2 hr. PR: An. Nu. 301 and consent. Diet preparation, food analysis, management of laboratory animals, demonstration of specific nutrient deficiencies and the conduct and analysis of animal feeding trials designed to examine the nutritional properties of experimental diets.

Animal Physiology and Breeding (An. Ph.)

100. *Introduction to the Physiology of Domestic Animals.* I, II. 3 hr. PR: Biol. 1 or consent. The function and regulation of the principal systems of the animal body.

204. *Animal Physiology Laboratory.* I. 2 hr. PR: An. Ph. 100 or consent. Laboratory study of the physiological systems of animals and the influences of environment on these systems.

225. *Physiology of Reproduction.* II. 3 hr. PR: Course in biology. Comparative physiology of reproduction in higher animals; endocrine functions involved in reproduction; genetic and environmental variations in fertility mechanisms.

226. *Breeding of Farm Animals.* I. 3 hr. PR: Course in genetics or consent. Application of principles of quantitative genetics to the improvement of farm animals.

280. *Behavioral Patterns of Domestic Animals.* II. 3 hr. (1 lab.). Examination of the bases for exhibition and control of behavioral patterns of domestic animals.

Animal Production (An. Pr.)

108. *Animal Production Experience.* I, II. 1 hr. (3 hr. lab.). A maximum of 4 credit hours may be earned by enrolling in this course. Experience in operating a poultry, dairy, or livestock farm, including trapnesting, incubation, and pedigreeing poultry; feeding, handling, calving, lambing, or farrowing of dairy and beef cows, sheep, and hogs.

137.* *Dairy Cattle History and Selection.* II. 3 hr. (2 labs.) To familiarize the student with the history, development, and programs of the breeds of dairy cattle as well as the modern concepts in phenotype and performance record evaluation.

138.* *Grading and Selection of Meat and Meat Animals.* II. 3 hr. (2 labs.). Appraisal of live meat animals, carcasses and cuts; evaluation of scientific techniques used in selecting meat animals and evaluating carcass meat.

139.* *Selection, Evaluation, and Grading of Meat Animals.* I. 2 or 4 hr. PR: An. Pr. 138 and consent. Evaluation of breeding merit and potential carcass characteristics of red meat animals. Tours of representative flocks and herds will be required.

141.* *Beef Production.* I. 3 hr. (1 lab.). PR: An. Nu. 101. Physiological and economical bases of beef production.

142.* *Pork Production.* I. 3 hr. (1 lab.). PR: An. Nu. 101. Physiological and economical bases of pork production.

144.* *Light Horse Science.* II. 3 hr. (1 lab.). PR: An. Nu. 101. The application of breeding, nutrition, physiology, and pathology to production and management of light horses. *(Course will not be offered in 1979-80.)*

145.* *Milk Production.* II. 3 hr. (1 lab.). Feeding and management of dairy cattle.

*Transportation for required trips in connection with these courses will generally be supplied by the College of Agriculture and Forestry. Students are responsible for their meals and lodging.

146.* *Sheep Production.* II. 3 hr. (1 lab.). PR: An. Nu. 101. Physiological and economical bases of sheep production.

240.* *Poultry Production.* I. 3 hr. (1 lab). PR: An. Nu. 101. Special phases of broiler and egg production, disease control, laborsaving studies, and recent designs in building and heating equipment for all types of poultry.

250. *Current Literature in Animal Science.* I. 3 hr. PR: An. Nu. 101. Evaluation of current research in animal science and its application to production and management.

Food Science (Fd. Sc.)

107. *Milk and Public Health.* I. 3 hr. (1 lab.). Food value of milk and its production and processing in relation to public health. *(Offered in Fall of odd years.)*

112. *Dairy Technology.* II. 3 hr. (1 lab.). Introductory. Composition and properties of milk and milk products, butterfat testing; manufacture of dairy products. *(Offered in Spring of odd years.)*

130. *Market Milk Products and Frozen Desserts.* I. 4 hr. (1 lab.) Assembling, processing, packaging, storing and merchandising dairy products. *(Offered in Fall of even years.)*

134. *Judging Dairy Products.* II. 2 hr. (2 labs.). A laboratory course in evaluating and judging dairy products.

166. *Meat Technology.* I. 3 hr. The techniques of red meat, poultry, and game slaughter; holding, cutting, identification, evaluation, and sausage manufacture are studied. Meat plant operations, as well as home slaughter, are explored.

167. *Meat Science.* I. 3 hr. PR: One year chemistry; a biology course. The basic physical, chemical, anatomical characteristics of red meats are studied. Fabrication of meats and meat products and economic evaluation of carcasses are emphasized in the laboratory.

267. *Advanced Meat Science.* II. 3 hr. PR: Fd. Sc. 167. Carcass composition, the transformation of muscle to meat, and properties of meat which affect water binding capacity, pigment formation, meat texture, fiber characteristics, and meat palatability are studied. Marketing trends are also investigated.

Veterinary Science (Vet. S.)

102. *Animal Pathology.* II. 3 hr. Diseases of animals, with special emphasis on the common diseases.

210. *Principles of Laboratory Animal Science.* I. 3 hr. (1 lab.). PR: Consent for undergraduates. The management, genetics, physiology, nutrition, disease, and germ-free quartering of common laboratory animals.

305. *Parasitology.* II. 3 hr. PR: Course in biology. Common parasites of farm animals, their control, and their effect upon the host. (*Offered in Spring of odd years.*)

Division of Forestry

Faculty

Wallace W. Christensen, Ph.D. (SUNY), *Chairman, Division of Forestry; Professor of Forest Economics and Forest Economist.*

Eugene C. Bammel, Ph.D. (Syracuse U.). *Assistant Professor of Recreation and Leisure Studies and Assistant Forest Scientist.*

Lei L. Bammel, Ph.D. (U. Utah), *Assistant Professor of Recreation and Leisure Studies and Assistant Forest Scientist.*

George H. Breiding, B.S. (Ohio St. U.). *State Extension Program Leader — Outdoor Recreation and Associate Professor of Forestry.*

Samuel M. Brock, Ph.D. (U. Minn.), *Professor of Forest Economics.*

Maurice G. Brooks, M.S. (WVU), *Professor Emeritus of Wildlife Management*
Kenneth L. Carvell, D.For. (Duke U.),*Professor of Silviculture and Silviculturist.*
Franklin C. Cech, Ph.D. (Tex. A&M U.), *Professor of Genetics and Forest Geneticist.*
Jack I. Cromer, M.W.M. (U. Mich.), *Instructor in Wildlife Management (Supervisor of Game Research, West Virginia Department of Natural Resources.)*
John D. Gill, M.S. (Mich. St. U.), *Assistant Professor of Wildlife Management. (Wildlife Biologist, U.S. Forest Service Forestry Sciences Laboratory.)*
Allen W. Goodspeed, M.F. (Yale U.), *Professor Emeritus of Forest Management.*
William N. Grafton, M.S.F. (WVU), *Associate Professor and Area Extension Specialist — Forestry.*
Carter S. Hall, M.B.A. (WVU), *State Extension Specialist — Forest Industries and Associate Professor.*
John R. Hamilton, Ph.D. (N.C. St. U.), *Professor of Wood Science and Wood Scientist.*
William M. Healy, B.S. (Penn. St. U.), *Instructor in Wildlife Management. (Wildlife Biologist, U.S. Forest Service Forestry Science Laboratory.)*
Ray R. Hicks, Ph.D. (SUNY), *Associate Professor of Forest Management and Associate Forester.*
Joseph M. Hutchison, Jr., M.S. (WVU), *Professor of Recreation.*
Norman D. Jackson, M.W.T. (N.C. St. U.), *Assistant to Chairman; Associate Professor of Wood Science and Associate Wood Scientist.*
Etley P. Jenkins, M.S. (WVU), *Associate Professor of Wood Science and Associate Wood Scientist.*
Beverly Hummel, M.S. (U. Ill.), *Assistant Professor of Recreation.*
William E. Kidd, Jr., M.S. (VPI), *State Extension Specialist — Forest Management and Professor.*
Christian B. Koch, Ph.D. (U. Mich.), *Professor of Wood Science and Wood Scientist.*
Richard Lee, Ph.D. (Colo. St. U.), *Professor of Forest Hydrology and Forest Hydrologist.*
William R. Maxey, M.S.F. (WVU), *Associate Professor of Forest Management and Forest Manager.*
Edwin D. Michael, Ph.D. (Tex. A&M U.), *Professor of Wildlife Management and Associate Wildlife Biologist.*
W. Clement Percival, Ph.D. (SUNY), *Professor Emeritus.*
David E. Samuel, Ph.D. (WVU), *Associate Professor of Wildlife Management and Associate Wildlife Biologist.*
William M. Santonas, B.S. (Ohio U.), *Instructor in Wildlife Management. (Supervisor of Resources Planning, West Virginia Department of Natural Resources.)*
Robert L. Smith, Ph.D. (Cornell U.), *Professor of Wildlife Management and Wildlife Biologist.*
Stanislaw Jan Tajchman, Ph.D. (U. Munich), *Associate Professor of Forest Meterology and Associate Forest Scientist.*
Anthony C. Tomkowski, M.S. (WVU), *Assistant Professor of Forestry.*
Earl H. Tryon, Ph.D. (Yale U.), *Professor Emeritus of Silviculture.*
Ben W. Twight, Ph.D. (U. Wash.), *Associate Professor of Forest Recreation.*
David E. White, Ph.D. (SUNY), *Professor of Forest Economics and Forest Economist.*
Robert C. Whitmore, Ph.D. (B. Young U.), *Assistant Professor of Quantitative Ecology and Assistant Forest Scientist.*
Harry V. Wiant, Ph.D. (Yale U.), *Professor of Forestry and Forester.*
William L. Wylie, M.S. (WVU), *Associate Professor of Forest Recreation.*
Joseph N. Yeager, M.S. (WVU), *Assistant Professor and Area Extension Specialist — Forestry.*
Gary W. Zinn, Ph.D. (SUNY), *Associate Professor of Forest Management and Associate Forester.*
Peter E. Zurbuch, M.S. (U. Mich.), *Assistant Professor of Wildlife Management (Assistant Chief, Wildlife Research, West Virginia Department of Natural Resources.)*

Programs of Study

The Division of Forestry offers curriculums in Forest Resources Management, Wood Industries, Recreation and Parks Management, and Wildlife Resources. The first two curriculums lead to the degree of Bachelor of Science in Forestry (B.S.F.); the curriculum in Recreation and Parks Management leads to the degree of Bachelor of Science in Recreation (B.S.R.); the Wildlife Resources curriculum leads to the degree of Bachelor of Science (B.S.).

West Virginia University is one of forty institutions of higher learning in the United States whose forestry programs are accredited by the Society of American Foresters. The society is the accrediting agency recognized by the U. S. Office of Education.

Entrance Requirements

Students who wish to major in one of the curriculums offered by the Division of Forestry must have completed at least 30 hours of college credit with a stipulated grade-point average. The 30 hours may be earned at any institution of higher learning. Specific requirements are listed in each curriculum.

Students enrolling at WVU as freshmen who wish to gain admission to one of the Division of Forestry curriculums will be enrolled as general forestry students in the College of Agriculture and Forestry, to fulfill the entrance requirements of the curriculum in which he or she wishes to major. Entrance requirements must be satisfied by the time the student has completed no more than 70 hours of credit at WVU. Otherwise, the student *will not* be admitted to a Division of Forestry major.

Transfer students who wish to major in one of the curriculums offered by the Division of Forestry must also satisfy the specified entrance requirements. Transfer students who have completed the basic 30 hours and have attained the stipulated grade-point average *or* students with 70 or more hours of credit, not including the specified courses, but who have attained the stipulated grade-point average, will be admitted directly to their chosen curriculum.

Transfer students with 70 or more hours of credit but who have not attained the stipulated grade-point average will be permitted to enroll for one probationary semester in the general forestry curriculum. At the conclusion of the probationary semester, if the stipulated grade-point average has not been attained, another major must be elected in order to remain enrolled at WVU.

Transfer students with less than 70 hours of credit who have not completed the specified courses and/or have not attained the stipulated grade-point average will be enrolled in the pre-forestry curriculum until the basic requirements of the curriculum in which he or she plans to major have been fulfilled. However, the 70 credit-hour maximum rule applies (see paragraph 2, above).

General forestry students *will not* be allowed to enroll in any Division of Forestry course which bears the prerequisite *forestry major or consent.*

To determine the grade-point average to qualify for admission to a Division of Forestry major, the course grades for college work attempted at *all* schools attended will be used.

Transfer Credits for Professional Courses

Students transferring to the Division of Forestry from one- or two-year technical schools or from four-year unaccredited forestry schools must take an

advanced standing examination to demonstrate proficiency for any professional course offered by the Division of Forestry for which transfer credit is sought. This rule also applies to courses in dendrology and surveying. Advanced standing examinations are given after the student is enrolled in the Division of Forestry. All other credits are accepted subject to the regulations of the Office of Admissions and Records regarding transfer of credits.

Bachelor of Science in Forestry

FOREST RESOURCES MANAGEMENT CURRICULUM

Students who major in Forest Resources Management take a course of study of 138 credit hours, at least 27 of these hours consisting of courses in one of three areas of emphasis: forest biology and ecology, administration and control of forest resources, or the social context of forestry. With the growing demand for forest products and the increasing public consciousness of the value of wildland for recreation, watershed protection, and aesthetics, career opportunities for professionals educated in the scientific management of timber resources are expanding. Graduates in this field have a wide range of employment alternatives, including federal and state agencies and private industry.

Students who wish to major in Forest Resources Management must have earned at least 30 hours of college credit with a grade-point average of 2.0 or better. The 30 hours must include 6 hours of English, 8 hours of chemistry (Chem. 15 and 16 or equiv.), 8 hours of biology, and 6 hours of mathematics through college algebra and trigonometry. (Math. 14, Pre-Calculus Mathematics, fulfills the mathematics requirement.) The student is encouraged to fulfill the University requirement of 2 hours of physical education during the first year. *Note:* Credit for Math. 2, Algebra, will not count as credit earned for degree requirements.

Curriculum Requirements	*Hours*
Entrance	30
Biology 51, 52 — Dendrology — Angiosperms, Gymnosperms	3
Economics 54 — Principles of Economics	3
Mathematics 15 — Calculus	4
Statistics 101 — Elementary Statistical Inference or equiv	3
Civil Engineering 5 — Land Surveying	4
Forest Management 12, 122, 151, 200, 201, 211, 230, 233, 234	29
Wood Science 121	3
Core electives	18
Communication elective	3
Restricted electives	27
Free electives	11
Total	138

Restricted Electives and Subject Areas

The student must complete a minimum of 27 hours in the three subject areas shown below. At least 5 credit hours must be chosen from each subject area. No course may be used to satisfy both subject area and University Core Curriculum requirements. Restricted electives will be chosen according to the goals of the student and with the adviser's consent. The courses listed under each subject area heading is not inclusive of all courses which might be legitimate electives in that subject area.

Subject Area I — Forest Biology and Ecology
Agronomy 10, 115, 210, 230
Biology 103, 151, 169
Entomology 152
Forest Management 213, 215, 216
Forestry 218, 219
Plant Pathology 153
Wildlife Management 131
Subject Area II — Administration and Control of Forest Resources
Accounting 51
Civil Engineering 6
Computer Science 1
Finance 161
Forest Engineering 291
Forest Management 222, 232
Forestry 226
Mathematics 16
Recreation and Parks 233
Statistics 201, 215, 231
Wood Science 234
Subject Area III — Social Context of Forestry
Agricultural Economics 200
Business Law 111
Economics 55, 130, 160, 211
Forestry 220, 233
Management 105
Political Science 140, 234
Psychology 164
Sociology and Anthropology 7

Bachelor of Science in Forestry

WOOD INDUSTRIES CURRICULUM

Wood Industries majors take a course of study of 138 credit hours with emphasis in management, production, or science. Graduates are sought by manufacturers of lumber, veneer, plywood, pulp and paper, and other wood products. Other opportunities exist with wood-using industries such as railroads, public utilities, and construction firms.

Students who wish to major in Wood Industires must have earned at least 30 hours of college credit with a grade-point average of 2.0 or better. The 30 hours must include 6 hours of English, 8 hours of chemistry (Chem. 11 and 12 or equiv.), 4 hours of biology, and 6 hours of mathematics through college algebra and trigonometry. (Math. 14, Pre-Calculus Mathematics, fulfills the mathematics requirement). The student is encouraged to fulfill the University requirement of 2 hours of physical education during the first year.

Note: Credit for Math. 2, Algebra, will not count as credit earned for degree requirements.

Curriculum Requirements	*Hours*
Entrance	30
Biology 51, 52 — Dendrology — Angiosperms, Gymnosperms	3
Economics 54, 55 — Principles of Economics	6
Mathematics 15 — Calculus	4
Physics 1 — Introductory Physics	4
Civil Engineering	2
Forest Management 12, 122, 211, 233	15
Wood Science 123, 132, 134, 141, 200, 201, 240	20
Core electives	18
Restricted electives	36
Total	138

Restricted Electives and Areas of Emphasis

Part of the 36 hours of restricted electives can be selected by the student, with the adviser's consent, according to the student's interest. However, the student must select one of the following three areas of emphasis and take all those courses listed under that area:

Management —

Requirements	*Hours*
Accounting 51, 52 — Principles of Accounting	6
Management 105 — Management Process	3
Marketing 111 — Marketing	3
Finance 111 — Business Finance	3

Production —

Requirements	*Hours*
Industrial Engineering 140 — Motion and Time Study	3
Wood Science 231, 232, 234, 251	12

Science —

Requirements	*Hours*
Chemistry 133, 135 — Organic Chemistry and Laboratory	4
Mathematics 16 — Calculus	4
Physics 2 — Introductory Physics	4
Mechanical Engineering and Mechanics 51, 52 — Engineering Mechanics	8

Bachelor of Science in Recreation

RECREATION AND PARKS MANAGEMENT CURRICULUM

The Recreation and Parks Management curriculum consists of 134 hours and is designed to prepare students for a wide variety of professional recreation responsibilities in governmental agencies, private industry, schools, churches, public housing, hospitals, and other agencies serving a society which has become increasingly aware of appropriate use of leisure time. As our society continues to use its scientific knowledge in development of its natural and cultural resources, recreation will become more important as a social concern.

Students must have earned at least 30 hours of college credit with a grade-point average of 2.25 or better. The 30 hours must include 6 hours of English, 8 hours of biology, 6 hours of mathematics (college algebra, trigonometry, calculus, finite math, or statistics), and 3 hours each of economics, psychology, and

sociology and anthropology. The student is encouraged to fulfill the University requirement of 2 hours of physical education in the first year.

Note: Credit for Math. 2, Algebra, will not count as credit earned for degree requirements.

Curriculum Requirements	*Hours*
Entrance	30
Recreation and Parks 43, 44, 202, 233 or 235, 265, 272	19
Core electives	15
Restricted electives	55
Free electives	15
Total	134

Restricted Electives and Areas of Emphasis

The program of study provides for three areas of emphasis: Administration, Interpretation, and Program Leadership. The student, with the adviser's consent, takes restricted elective courses which will contribute to the student's proficiency in one of the three areas.

Recreation Administration —

Emphasis is on the sciences and arts essential to administration of recreation centers, areas, and systems. There is sufficient flexibility to permit students to emphasize either urban and regional recreation administration or wildland recreation management. Students take courses in such fields as management, economics, political science, psychology, sociology and anthropology, forestry, resource management, and others which contribute to their understanding of decision making.

Interpretation (Interpretive Naturalist) —

The interpretive specialist needs a strong foundation in the sciences and arts, human behavior, and the technical skills necessary for the preparation and presentation of interpretive materials. Restricted electives in this area of emphasis will include courses in such fields as biology, communication, forestry, geology, history, and wildlife management. The principal employing agencies are the National Park Service, U. S. Forest Service, state and local recreation and parks departments, school systems, and private recreation enterprises.

Program Leadership —

Emphasis is on the knowledge and skills required for the planning, development, and operation of recreation programs. Recommended for those persons who are especially interested in working closely with the users of recreation services in community agencies, recreation centers, youth serving organizations, and tourism centers serving transient populations. Students will take restricted electives spanning all forms of recreation including performing and applied arts, sports, and outdoor recreation. The academic agenda is sufficiently flexible to permit further specialization for working with special groups such as the ill, the handicapped, the aged, and the institutionalized.

Bachelor of Science

WILDLIFE RESOURCES CURRICULUM

Wildlife Resources majors take a program of study of 136 hours in preparation for professional positions as game and fish biologist, wildlife manager, planner of wildlife conservation programs, or specialist in communicating with the public regarding wildlife. The program usually leads to employment with a public agency, and in a wide range of positions because of the breadth of the graduate's background in ecology.

Thirty hours of college credit with a grade-point average of 2.25 or better is required for admission to the program. The 30 hours must include 6 hours of English, 8 hours of chemistry (Chem. 15 or 16 or equiv.), 8 hours of biology, and 6 hours of mathematics through college algebra and trigonometry. (Math. 14, Pre-Calculus Mathematics, fulfills the mathematics requirement.) The student is encouraged to fulfill the University requirement of 2 hours of physical education in the first year.

Note: Credit for Math. 2, Algebra, will not count as credit earned for degree requirements.

Curriculum Requirements	*Hours*
Entrance	30
Chemistry 131 — Organic Chemistry	4
Mathematics 15 — Calculus	4
Economics 54 — Principles of Economics	3
Computer Science 1 — Introduction to Computer Science	3
Geology 1 — Physical Geology	3
Speech Communication 11, 14 — Prin. of Human Communication	3
Statistics 101 — Elementary Statistical Inference	3
Genetics 171 — Principles of Genetics	4
Political Science	3
Animal Physiology 100 — Intro. to Phys. of Domestic Animals	3
Wildlife Management 213, 224, 231,* 234*	13
Core electives	15
Restricted electives	32
Free electives	13
Total	136

*Students interested in fisheries will take limnology, ichthyology, or other approved courses in aquatic ecology, in lieu of W. Man. 231 and 234.

Restricted Electives and Areas of Emphasis —

The wildlife resources program provides for five areas of emphasized study: wildlife science, wildlife management, fisheries science, communications, and planning. The student, consulting with the adviser in selection of courses, will use the restricted elective hours so as to provide appropriate background in the area chosen for emphasis.

Summer Field Studies

The 6-hour Forest Resources Management Summer Field Practice (F. Man. 200 and 201) consists of two consecutive sessions, and is designed for students who have completed the junior year of the Forest Resources Management curriculum. Students live in Morgantown in University or privately owned hous-

ing, and travel to the University Forest daily for field studies. The first session provides training in forest surveying, timber estimating, photo interpretation, forest management, and forest recreation. Occasional trips are made to wood-using industries and to other forests to study the management of northern hardwood and spruce types. The second session is a one-week trip to North Carolina where silvicultural and management activities are observed in the Southern Pine Region.

The instructional program in the 5-hour Wood Industry Field Practice (Wd. Sc. 200 and Wd. Sc. 201) consists of a three-week field course in surveying and mensuration followed by a two-week trip to Virginia and North Carolina to observe various commercial wood-using industries. These industries include: lumber, plywood, veneer, particle board, furniture, glue lamination, and preservation.

A Recreation Internship (Rc. & Pk. 202) is required of students who have completed the sophomore year of the Recreation Resources Management curriculum. Eight weeks of full-time supervised professional field work is required of students who have completed the junior year of the recreation curriculum. The summer experiences acquaint students with management of park and recreation enterprises.

For resident students the tuition is $11.00 per credit hour; for nonresidents the tuition is $53.00 per credit hour. These must be paid to the University Comptroller at registration. Other expenses include lodging and meals for courses in which travel is involved.

Courses of Instruction

Forestry (For.)

1. *Professional Orientation.* I. 1 hr. (Required only for students who rank as freshmen in forestry.) Survey of degree options in the Division of Forestry and related career and professional opportunities.

3, 4. *Forestry Convocation.* I and II. No credit. All students are expected to attend the weekly convocation. Attendance required of students during first two semesters in forestry. Speakers and timely topics in forestry and allied fields presented.

140. *West Virginia's Natural Resources.* I, II. 3 hr. Survey of policies and practices in development and use of soil, water, forest, wildlife, mineral, and human resources in West Virginia.

170. *Problems in Forestry, Wood Science, Wildlife, or Recreation.* I, II, S. 1-4 hr. PR: Forestry senior or consent.

220. *Forest Policy and Administration.* I and II. 3 hr. PR: Upperclass forestry major or consent. Forest policy in the United States; important federal and state laws; administration of public and private forests; problems in multiple-use forestry.

226. *Remote Sensing of Environment.* II. 2 hr. PR: Math. 3, 4. Measurement and interpretation of natural resources and environment from photography, radar, infrared, and microwave imagery.

233. *Principles of Industrial Forestry.* II. 3 hr. PR: Forestry senior or consent. Analysis and case studies of problems pertinent to the integration of wood conversion technology with principles of production, marketing, and management.

Forest Hydrology (F. Hyd.)

41. *Environmental Influences in Forestry.* I. 3 hr. PR: Phys. 1, 2. An introduction to the influences of forests and forestry practices on physical processes that affect the environment.

142. *Forest Climatology.* II. 3 hr. PR: F. Hyd. 41, Phys. 117. The principles, instrumentation, measurement techniques, and applications of forest or terrain climatology in a broad range of forestry endeavors.

241. *Forest Hydrology: Principles.* I. 3 hr. PR: Forestry major. Description and quantitative treatment of the hydrologic cycle in nature, with primary emphasis on the role of forests and terrain.

242. *Forest Hydrology: Practices.* II. 3 hr. PR: F. Hyd. 241. Applications of forest hydrology and climatology in the management of forest land for optimum yields of water, and to minimize erosion, pollution, and flood damage.

243. *Forest Water Quality.* I. 2 hr. PR: Forestry major or consent. Influences of natural forest cover, forest land uses, and harvesting practices on selected water quality parameters that can be detected in simple field and laboratory tests.

Forest Management (F. Man.)

12. *Forest Ecology.* I, II. 3 hr. PR: Biol. 51. Forest and environment factors; site and type characteristics.

122. *Forest Mensuration.* I, II. 4 hr. PR: Math 3, 4, Stat. 101 or equiv. or consent.

132. *Farm Woods Management.* II. 3 hr. Students majoring in forest resource management and wood industry may not take this course for credit. Characteristics of forest trees; management of farm woods for timber, wildlife, watershed protection, and recreation; measuring and marketing farm timber; plantation establishment.

151. *Forest Fire Protection.* I. 2 hr. Prevention, detection, and control of wildfires. Forest fuels, fire weather and wildfire behavior. Use of fire for forest management purposes.

200. *Forest Measurement, Interpretation, Wildlife Management.* S. 5 hr. PR: Biol. 51; C.E. 5; F. Man. 122. Application and study of forest resources practice with emphasis on field problems. Course will be taught during four consecutive 6-day weeks.

201. *Forest Resources Management Southern Trip.* S. 1 hr. PR: F. Man. 200 or consent. One-week trip to the Southern Pine Region to observe forest management practices on private and public lands.

211. *Silvicultural Systems.* I. 4 hr. PR: Forestry major or consent; F. Man. 12. Principles of regeneration cuttings, intermediate cuttings, and cultural operations, with their application to forest stands.

213. *Regional Silviculture.* I. 2 hr. PR: Forestry major or consent; F. Man. 12; PR or Conc.: F. Man. 211. Major forest types of the United States: their composition, management, problems, and silvicultural treatment.

215. *Principles of Artificial Forestation.* II. 3 hr. PR: Forestry major or consent: F. Man. 12. Seeding and planting nursery practice; phases of artificial regeneration.

216. *Forest Genetics and Tree Improvement.* II. 3 hr. PR: Forestry major or consent; Gen. 272. or equiv., or consent. Forest genetic principles and their application to forest tree improvement, including crossing methods, selection systems, and other techniques.

222. *Advanced Forest Mensuration.* II. 3 hr. PR: Forestry major or consent; F. Man. 122. Measurement of growth and yield; statistical methods applied to forest measurement problems.

230. *Principles of Forestry Economics.* I, II. 3 hr. PR: Forestry major or consent; Econ. 51 and 52 or equiv. Production, distribution, and use of forest goods and services. Emphasis on analytical methods and techniques dealing with forest economic problems.

232. *Forest Finance.* II. 2 hr. PR: Forestry junior or consent. Interest, discount, and rate earned, in forest production and exploitation. Particular reference to determining value of standing timber, appraisal of forest damages, and forest taxation.

233. *Forest Management.* I, II. 4 hr. PR: Summer Camp; PR or Conc.: Forestry major or consent; F. Man. 211. Principles of substained yield forest management. Organization of forest areas, selection of management objectives, application of silvicultural systems, and regulation of cut. Forest management plan.

234. *Integrated Forest Resources Management.* I, II. 3 hr. PR: Forestry major or consent; senior standing. Analysis and planning for management of forest resources. Primarily involves carrying out a major management problem assignment, with actual forest tracts as focal point.

330. *Advanced Principles of Forestry Economics.* II. 3 hr. PR: Econ. 51, 52 or equiv.; F. Man. 230 or equiv. Intensive study of both micro- and macroeconomics of forestry.

Wood Science (Wd. Sc.)

121. *Wood Technology.* II. 3 hr. PR; Forestry major or consent; Biol. 51. For students other than those taking the wood industries and wood science options, designed to provide familiarity with the technical aspects of wood utilization.

123. *Wood Identification.* I. 3 hr. PR: Forestry major or consent; Biol. 51. Identification of commercial timbers of the U.S.; basic properties and uses of different woods.

132. *Primary Conversion and Grading.* II. 3 hr. PR: Forestry major or consent; Wd. Sc. 123. Principles of the conversion of raw material in log form to primary wood products. Elements of the grading of raw materials and primary products. Production planning and control.

134. *Secondary Manufacturing Processes.* II. 3 hr. PR: Wd. Sc. 123 or consent. Detailed study of the materials and processes involved in manufacture of secondary wood products.

141. *Properties of Wood.* I. 3 hr. PR: Forestry major or consent; Phys. 1, Wd. Sc. 123. Physical and mechanical properties of wood.

200. *Forest Measurement Field Practice.* S. 3 hr. (Pass-Fail grading.) PR: Forestry major, Biol. 51, C.E. 1, F. Man. 122. Application of surveying and mensurational practices with emphasis on field problems.

201. *Wood Industries Field Trip.* S. 2 hr. (Pass-Fail grading.) PR: Wd. Sc. 234. A 2-week trip to observe manufacturing methods and techniques of commercial wood industry plants. Plants visited include furniture, plywood, veneer, hard-board, particle-board, pulp and paper, sawmilling, and preservation. (*Offered in Summer of odd years.)*

230. *Wood Machining.* II. 2 hr. PR: Consent, Introduction to basic concepts of wood machining with emphasis on production equipment and furniture manufacturing.

231. *Wood Finishing.* I. 3 hr. PR: Forestry major or consent; Wd. Sc. 121. Surface preparation, composition of finishing materials, equipment, techniques, defects, troubleshooting, and quality control.

232. *Wood Adhesion: Theory and Practice.* I. 2 hr. PR: Wd. Sc. 123 and 141. Detailed theoretical introduction and examination of different types of adhesives and gluing techniques used in the wood industry.

234. *Statistical Quality Control.* I. 3 hr. PR: Forestry major or consent; Wd. Sc. 134. Methods used to control quality of manufactured wood products. Control charts of variables and attributes. Acceptance sampling techniques.

235. *Light-Frame Wood Construction.* I. 2 hr. PR: Forestry major or consent. Use of wood in light-frame construction. Basic design procedures and construction methods.

240. *Wood Moisture Relationships.* II. 3 hr. PR: Forestry major or consent; Wd. Sc. 123. Principles involved in the relation between wood and moisture, and purposes, effects, and methods of seasoning.

251. *Forest Products Protection.* II. 3 hr. PR: Forestry major or consent; Wd. Sc. 123, 134. Biological organisms responsible for deterioration of wood products, their control by preservative methods, and study of fire retarding methods.

320. *Wood Microstructure.* I. 3 hr. PR: Wd. Sc. 123; senior standing, or consent. Detailed examination of wood microstructure as it relates to processing, behavior, and identification.

Wildlife Management (W. Man.)

122. *Ornithology.* II. 2 hr. PR: Biol. 1, 2, or consent. Identification, distribution, and ecology of birds (particularly of forest lands).

131. *Wildlife Management.* I. 3 hr. PR: Biol. 2. (Students majoring in wildlife management may not take this course for credit.) Basic principles of handling wildlife as a forest crop, including population of dynamics, ecological relationships, social behavior, habitat manipulation, and game administration.

151. *Attitudes Toward Wildlife.* I. 3 hr. A consideration of man's changing perception of and relationships toward wild animals.

213. *Wildlife Ecology.* I. 4 hr. PR: Wildlife major or consent; Biol. 1 and 2. Basic principles of ecology and their application to wildlife. Field and laboratory studies of major ecosystems important to wildlife, including management of these ecosystems for wildlife.

222. *Field Ornithology.* S. 3 hr. PR: Biol. 2 or consent. Intensive field studies in recognition through sight, song, and behavioral patterns of birds, and their ecology in the central Appalachians.

224. *Forest Zoology 1.* I. 3 hr. PR: Biol. 2 or consent. Relationships of fish and amphibians, and reptiles, to the forest, with emphasis on the ecology, taxonomy, evolution, natural history, and field identification of these groups. Laboratory emphasizes natural history and anatomy of fish, amphibians, and reptiles.

225. *Forest Zoology 2.* II. 3 hr. PR: Biol. 2 or consent. Relationships of mammals to the forest, with emphasis on the ecology, taxonomy, evolution, natural history, and anatomy of mammals. Laboratory emphasizes natural history and anatomy of mammals.

231. *Wildlife Techniques.* I. 3 hr. PR: Wildlife major or consent; W. Man. 213, Biol. 151. Field and laboratory techniques necessary in management and study of wildlife; collection of field data, mapping, censusing, habitat evaluation, literature and scientific writing.

234. *Principles of Wildlife Management.* II. 3 hr. PR: Wildlife major or consent; W. Man. 213. Major game animals and problems and principles involved in their management.

312. *Wildlife Population Ecology.* II. 3 hr. PR: W. Man. 131, Stat. 211, or equiv. Theory of population growth, population change, intraspecific and interspecific relationships involved in natural regulation of populations, and effects of exploitation on wildlife populations.

333. *Quantitative Ecology.* I. (Alternate Years.) 3 hr. PR: Stat. 311 or equiv. and W. Man. 213 or equiv. A survey of techniques and strategies for the quantitative analysis of complex ecological data sets.

370. *Wildlife Seminar.* II. 1 hr. per sem.; (4 hr. max.). PR: Consent. Discussion of current developments in wildlife management.

Recreation and Parks (Rc. & Pk.)

13. *Recreation and the School.* I. 3 hr. PR: Recreation major or consent. Open to students with at least sophomore status in physical education. Study of basic concepts of play, recreation, leisure, and their relationship to physical education.

40. *Nature Recreation and Camping.* I. 3 hr. PR: Recreation major or consent; recreation majors. Lecture and workshop. Introduction to organized camping movement including purposes, camp sites, equipment, programs, and leadership. Exploration of nature recreation and its relationship to community recreation and camping programs.

41. *Social Recreation.* II. 3 hr. PR: Recreation major or consent. Lecture and workshop course. Place of social recreation activities, informal dramatic and music in community center, playground, camp and school extracurricular programs.

43. *Man and Leisure.* I. 3 hr. Function of leisure and play in the life of the individual and in society, in historical and current perspective.

44. *Introduction to Recreation and Park Services.* II. 4 hr. PR: Sophomore standing, second semester, Rc. & Pk. 43. Development of recreation, park, and conservation movements in U.S. and the responsible agencies; examination of principles, scope, and trends in program services, spatial accommodations; study of leadership in providing recreation services.

100. *Approved Summer Park Experience and Report.* S. 1 hr. PR: Recreation junior or consent. One summer's experience in management of a park or related recreational enterprise followed by a written report.

142. *Fundamentals of Nature Interpretation.* II. 3 hr. PR: Recreation junior or consent. Methods and techniques of interpreting the natural environment to individuals and groups.

201. *Wildland Search and Rescue Techniques.* I. 2 hr. PR: Consent. Acquaints future forest, park, and recreation area professionals with the safe methods, practices, and procedures of search and rescue of lost and/or injured persons. Some weekend field trips required.

202. *Recreation Internship.* I. 3 hr. PR: Rc. & Pk. 43, 44, 265; Recreation major or consent. A supervised, full-time recreation leadership responsibility for a minimum of 8 weeks. Position approval in advance. Comprehensive written analysis prepared following internship field experience.

224. *Outdoor Recreation in Our Modern Society.* II. 3 hr. PR: For persons in recreation, park, outdoor education and conservation, or consent. Interpretation as to what outdoor recreation is, what people do, where they go, how this affects our economic, social, and cultural life, and significant trends.

233. *Wildland Recreation Administration.* I. 3 hr. PR: Recreation junior standing or consent. Introduction to administration and management problems associated with providing recreation in wildland areas.

235. *Administration of Urban and Regional Recreation Services.* I. 3 hr. PR: Recreation major, Rc. & Pk. 43, 44, and 265 or consent. Administration of recreation and parks agencies, including legal foundations and responsibilities, organizational structures, personnel, finance, and services.

241. *Recreational Services for Special Populations.* I. 3 hr. PR: Consent. Introductory analysis of current therapeutics recreation services; attentiveness to the need for broadening recreation and park services to include members of special populations; familiarization with the planning consideration for the conduct of such services.

242. *Historical and Cultural Interpretation.* II. 3 hr. PR: Recreation major or consent. Methods of locating source materials for reconstructing the historical, cultural,

and physical aspects of an area for an interpretive center; preparing brochures, displays, and nature trails to facilitate interpretive activities.

248. *Environmental Concerns in Outdoor Recreation.* I. 3 hr. PR: Consent. Understanding and interpreting environmental concerns within the context of outdoor recreation.

251. *Recreation Leadership.* I. 3 hr. PR: Recreation major or consent. Leadership, its application to recreation, and analysis of techniques. Examination of social group work method and its application, particularly in national youth organizations.

263. *Program Planning.* II. 3 hr. PR: Recreation major or consent; Rc. & Pk. 1. Fundamentals for general program planning; considers needs, facilities, age groups, local customs, climatic factors, etc. Planning involved in playgrounds, indoor centers, playfields, parks, hospitals, voluntary agencies, industry, and campus.

265. *Functional Planning of Recreation and Park Facilities.* II. 3 hr. PR: Recreation major or consent. Lecture and workshop. Problems and principles governing planning for functional and effective use of recreation facilities. Emphasis on playgrounds, playfields, indoor centers, parks, camps, and swimming pools.

271. *Administration of Camping Services.* II. 3 hr. PR: Recreation major or consent; Rc. & Pk. 40 or equiv. Principles involved in modern camping programs, and organization and administration of camps.

272. *Professional Synthesis.* II. 3 hr. PR: Recreation major or consent; senior standing, last semester of professional education, 16 hr. professional courses in recreation and parks management. A "capstone" course which requires the student to synthesize professional training into analysis and solution of a special problem in the student's option of Recreation and Parks Management.

316. *Philosophy of Recreation.* II. 3 hr. PR: Consent. Interpretation of recreation as a basic part of the living process; importance to individual community and national welfare; social and economic significance.

Division of Plant Sciences

Faculty

Mannon E. Gallegly, Jr., Ph.D. (U. Wisc.), *Chairman, Division of Plant Sciences; Professor of Plant Pathology and Plant Pathologist.*

Robert E. Adams, Ph.D. (Cornell U.), *Professor of Plant Pathology and Plant Pathologist.*

Freddie L. Alt, M.S. (WVU), *Assistant Professor of Agronomy and Superintendent, Reedsville Experiment Farm.*

James W. Amrine, Jr., Ph.D. (Iowa St. U.), *Assistant Professor of Entomology and Assistant Entomologist.*

Robert E. Anderson, Ph.D. (U. Wisc.), *Associate Professor of Agricultural Microbiology and State Extension Specialist — Environmental Education.*

Barton S. Baker, Ph.D. (WVU), *Associate Professor of Agronomy and Associate Agronomist, Allegheny Highlands Project, Elkins.*

John A. Balasko, Ph.D. (U. Wisc.), *Professor of Agronomy and Agronomist.*

John F. Baniecki, Ph.D. (U. Ariz.), *Associate Professor of Plant Pathology and State Extension Specialist — Plant Pathology and Entomology.*

Horace L. Barnett, Ph.D. (Mich. St. U.), *Professor Emeritus of Mycology.*

Joseph G. Barrat, Ph.D. (U. N.H.), *Professor of Plant Pathology and Plant Pathologist; State Extension Specialist — Plant Pathology, University Experiment Farm, Kearneysville.*

Newton M. Baughman, Ph.D. (Purdue U.), *Professor of Agronomy and Agronomist.*

Bradford C. Bearce, Ph.D. (U. Cal.), *Professor of Horticulture and Horticulturist.*

Orus L. Bennett, Ph.D. (WVU), *Adjunct Professor of Agronomy and Research Soil Scientist, USDA.*

Gary K. Bissonnette, Ph.D. (Mont. St. U.), *Associate Professor of Microbiology and Associate Microbiologist.*

Steven H. Blizzard, Ph.D. (WVU), *Assistant Professor of Horticulture and Assistant to Director — Field Research, Plant Sciences Farms.*

James L. Brooks, Ph.D. (U. Cal.), *Associate Professor of Agricultural Biochemistry and Associate Agricultural Biochemist.*

William B. Bryan, Ph.D. (Iowa St. U.), *Associate Professor of Agronomy and Associate Agronomist.*

Linda Butler, Ph.D. (U. Ga.), *Professor of Entomology and Entomologist.*

William H. Childs, Ph.D. (Cornell U.), *Professor Emeritus of Horticulture.*

Edward S. Elliott, Ph.D. (WVU), *Professor of Plant Pathology and Plant Pathologist.*

Edwin Gould, B.S. (WVU), *Associate Professor Emeritus of Entomology.*

N. Carl Hardin, Jr., M.S. (WVU), *Professor of Horticulture and State Extension Specialist — Horticulture.*

Clinton E. Hickman, M.S. (WVU), *Assistant Professor of Horticulture and Assistant Horticulturist and Station Manager, Ohio Valley Farm, Point Pleasant.*

Dale F. Hindal, Ph.D. (Iowa St. U.), *Assistant Professor of Mycology and Assistant Mycologist.*

L. Morris Ingle, Ph.D. (Purdue U.), *Professor of Horticulture and Horticulturist.*

Everett M. Jencks, Ph.D. (Rutgers U.), *Associate Professor of Agronomy and Associate Agronomist.*

Walter J. Kaczmarczyk, Ph.D. (Hahnemann Med. C.), *Professor of Genetics and Geneticist.*

Robert F. Keefer, Ph.D. (Ohio St. U.), *Professor of Agronomy and Agronomist.*

Virgil G. Lilly, Ph.D. (WVU), *Professor Emeritus of Physiology.*

William L. MacDonald, Ph.D. (Iowa St. U.), *Associate Professor of Plant Pathology and Associate Plant Pathologist.*

Harry A. Menser, Ph.D. (U. Md.), *Adjunct Associate Professor of Agronomy — Research Scientist, USDA.*

Paul G. Moe, Ph.D. (Rutgers U.), *Professor of Bacteriology and Bacteriologist.*

Joginder Nath, Ph.D. (U. Wisc.), *Professor of Genetics and Geneticist.*

Oliver M. Neal, Jr., Ph.D. (Mich. St. U.), *Professor of Horticulture and Horticulturist.*

G. Gordon Pohlman, Ph.D. (Iowa St. C.), *Professor Emeritus of Agronomy.*

David O. Quinn, M.S. (WVU), *Professor of Plant Pathology and State Program Leader — Safe Use of Pesticides.*

Alan A. Rezek, B.S. (Parks C.) *Adjunct Assistant Professor of Plant Science.*

Oscar E. Schubert, Ph.D. (U. Ill.), *Professor of Horticulture and Horticulturist.*

George Sharpe, M.S. (WVU), *Associate Professor Emeritus of Agronomy.*

Rabindar N. Singh, Ph.D. (VPI), *Associate Professor of Agronomy and Associate Agronomist.*

Suman Singha, Ph.D. (Cornell U.), *Assistant Professor of Horticulture and Assistant Horticulturist.*

Richard M. Smith, Ph.D. (Ohio St. U.), *Professor of Agronomy and Agronomist.*

Charles B. Sperow, Jr., M.S. (WVU), *Professor of Agronomy and State Extension Specialist — Crops Agronomy.*

David A. Stelzig, Ph.D. (N.D. St. U.), *Professor of Agricultural Biochemistry and Plant Pathology and Agricultural Biochemist and Plant Pathologist.*

LeRoy P. Stevens, M.S. (WVU), *Associate Professor of Horticulture, Associate Horticulturist and Station Manager, Reymann Memorial Farm.*

R. Philip True, Ph.D. (U. Penn.), *Professor Emeritus of Plant Pathology.*

Valentin Ulrich, Ph.D. (Rutgers U.), *Professor of Genetics and Geneticist.*

Willem A. van Eck, Ph.D. (Mich. St. U.), *Professor of Soil Science and State Extension Specialist — Soil Science.*

Collins Veatch, Ph.D. (U. Ill.), *Professor Emeritus of Agronomy.*

Walter M. Wiant, M.S. (U. Md.), *Assistant Professor of Agronomy; Research Soil Scientist, USDA.*

Harold A. Wilson, Ph.D. (Iowa St. C.), *Professor Emeritus of Bacteriology.*

Robert J. Young, Ph.D. (Ore. St. U.), *Associate Professor of Plant Pathology and Associate Plant Pathologist.*

Roger S. Young, Ph.D. (Mich. St. U.), *Associate Professor of Horticulture and Associate Horticulturist, University Experiment Farm, Kearneysville.*
Richard L. Zimmerman, Ph.D. (WVU), *Associate Professor of Plant Sciences and State Extension Specialist, Plant Sciences and Conservation.*

Bachelor of Science in Agriculture

PLANT AND SOIL SCIENCES CURRICULUM

Students enrolled in this degree program may select courses to develop interest areas in *agronomy, horticulture, soil science, environmental protection,* or *basic science* to prepare for positions involving various phases of commercial crop production and use, soil conservation, pedology and soil survey, land reclamation and revegetation, land management and classification, fertilizer use, weed control, insect and disease control, plant breeding, farm management, and turf and golf course maintenance. Graduates may be self employed or develop careers with commercial industries involved with the development and distribution of pest-control chemicals, fertilizers, seeds and plants, and nursery, floral, garden, and turf products. Also, positions as estate and farm managers, land reclamationists, city and county planning technicians, park, and golf course superintendents, and environmental protectionists are available to graduates of this program, as well as many different positions with state and federal governmental agencies.

By judicious selection of courses the student may also acquire the necessary background in the *basic sciences* to enter professional or graduate programs of study in such fields as agricultural biochemistry, bacteriology, crop science, entomology, genetics, horticulture, mycology, plant pathology, and soil science.

For all students in the curriculum in Agriculture the program of courses taken in the freshman year is essentially the same. However, students are urged to select the appropriate adviser so that they may develop their program of study in one of the areas described above while meeting the requirements for the curriculum:

Curriculum Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C included)	24
(Must elect a minimum of 8 hours in biology; 8 hours in chemistry; 3 hours in college algebra or equivalent.)	
Courses in Agriculture	45
Elect a minimum of 3 credits in each of the following:	
1. Animal Science 3. Soil Science	
2. Plant Science 4. Agricultural Economics	
Elect additional courses to obtain a total of 45 hours in Agriculture.	
Physical Education	2
Free Electives*	35
Total	136

*May elect to take courses in Military Science or Air Force Aerospace Studies (ROTC).

Specific requirements for each of the program options are as follows:

Agronomy, Crop Science:
Phys. 1, 2; Geol. 1, 2; Gen. 171; Chem. 133, 134, 135, 136; Biol. 169; Gen. 290; P. Pth. 201; Ento. 204; Ag. Ec. 206.
15 hours of upper-division Agronomy courses.

Agronomy, Soil Science:
Phys. 1, 2; Geol. 1, 2; Gen. 171; Chem. 133, 134, 135, 136; Biol. 169; Ento. 204; Ag. Ec. 206.
15 hours of upper-division Agronomy courses.

Horticulture:
Biol. 2, 169; Chem. 133, 135, 131; Ento. 204; Hort. 107, 204; P. Pth. 201.

Environmental Protection:
Chem. 133, 135, 131; C.E. 190, 251; Ento. 204, 210; Bact. 141, 201; P. Pth. 201; W. Man. 213.

Basic Science:
Math. 3, 4, 15, 16; Chem. 133, 135, 134, 136; Phys. 1, 2; Biol. 169; Bact. 141; Ag. Bi. 210; Stat. 101.

Courses of Instruction

Assigned Topics

In order to be eligible to register in Assigned Topics 180, the student must: (1) be in good standing, and (2) obtain approval of the appropriate Division Director before registration.

Plant Science (Pl. Sc.)

52. *Principles of Plant Science.* I, II. 4 hr. Basics of the nature, history, classification, role, distinction, structure and function, reproduction, improvement, culture, pests, storage and handling, production and marketing, and utilization of agricultural plants.

180. *Assigned Topics.* I, II, S. 1-4 hr. Special studies in agronomy (crops and soils), bacteriology, horticulture, or plant pathology. Students eligible for this course must be in good standing and have prior Division approval of a proposed outline.

195. *Seminar.* I, II. 1 hr. A seminar aimed at exploring, through a discussion format, current problems in agriculture and agricultural environmental protection.

200. *Recognition and Diagnosis of Plant Disorders.* I. 4 hr. PR: P. Pth. 201 and Ento. 204. Creates an ability for the student to use systematic inspection to determine cause or causes of a plant disorder.

201. *Principles and Methods of Plant Pest Control.* II. 4 hr. PR: P. Pth. 201 and Ento. 204. Concepts of control and how they are implemented by exclusion, eradication, protection, and immunization.

Agronomy (Agron.)

2. *Principles of Soil Science.* II. 4 hr. PR: Inorganic chemistry. An introduction to soil science. 3 lec., 1 lab.

10. *Forest Soils.* I. 3 hr. PR: Inorganic chemistry. Principles of soil science with particular reference to forest soils. 2 lec., 1 lab.

115. *Soil Judging, Mapping, and Interpretation.* I. 3 hr. PR: Agron. 2 or 10. Techniques in observing and describing soil profiles, mapping by modern systems and interpreting basic soil surveys for varied soil use.

210. *Soil Fertility.* I. 3 hr. PR: Agron. 2 or 10. Soil properties in relation to fertility and productivity of soils; evaluation of soil fertility; production of fertilizers and their use in increasing soil fertility and productivity.

212. *Soil Conservation and Management.* II. 3 hr. PR: Agron. 2 or 10. Using soil technology to solve soil management problems relating to cropping systems. Field diagnosis of soil problems stressed.

230. *Soil Physics.* II. 3 hr. PR: Agron. 2 or 10. Physical properties of soils; water and air relationships and their influence on soil productivity. (*Offered in Spring of even years.*)

250. *Turfgrass Management.* I. 3 hr. PR: Agron. 2 or consent. Establishment, maintenance, and adaption of grasses and legumes for lawns, golf courses, parks, athletic fields, and roadsides. Associating differential plant responses with soil, climatic, and biotic factors. Field trips arranged.

251. *Weed Control.* I. 3 hr. PR: Pl. Sc. 52, Agron. 2, or consent. Fundamental principles of weed control. Recommended control measures for and identification of common weeds. (*Offered in Fall of odd years.*)

252. *Grain and Special Crops.* II. 3 hr. PR: Pl. Sc. 52, Agron. 2, or consent. Advanced study of methods in the production of grain and special crops. Varieties, improvement, tillage, harvesting, storage, and use of crops grown for seed or special purposes. (*Offered in Spring of even years.*)

254. *Pasture and Forage Crops.* I. 4 hr. PR: Pl. Sc. 52, Agron. 2, or consent. All phases of pasture and forage crop production, including identification, seeding, management, use, seed production, and storage of forage crops. 3 lec., 1 lab.

301. *Geotechnic.* I. 3 hr. PR: Consent. A unified approach to various aspects of soil formation and influence of formative factors on the nature of soils and their use as engineering materials. Course serves as a common meeting ground for students in the various disciplines concerned with earth science. 3 lec. (*Offered in Fall of odd years.*)

315. *Soil Genesis and Classification.* I. 3 hr. PR: Agron. 2 or 10. Origin and formation of soils. Study of soil profiles and soil-forming processes in field and laboratory. Principles of classification and techniques of soil mapping. 2 lec., 1 lab. (*Offered in Fall of even years.*)

Bacteriology (Bact.)

141. *General Bacteriology.* I, II. 4 hr. PR: Inorganic chemistry. Introductory morphological, cultural, and physiological characteristics of bacteria; application of bacteriology to agriculture, home economics, sanitation, and health.

201. *Environmental Microbiology.* II. 4 hr. PR: Bact. 141 or consent. Microbiology as applied to soil, water, wastewater, sewage, air, and the general environment. Occurrence, distribution, ecology and detection of microorganisms in these environments.

347. *Food Microbiology.* I. 4 hr. PR: Bact. 141, organic chemistry or consent. Ecology and physiology of microorganisms important in the manufacture and deterioration of foods. Techniques for the microbiological examination of food. (*Offered in Fall of even years.*)

348. *Sanitary Bacteriology.* I. 3 hr. PR: Bact. 141. Bacteriology and health hazards associated with food handling, water treatment, and sanitary waste disposal. (*Offered in Fall of odd years.*)

Entomology (Ento.)

152. *Forest Entomology.* II. 3 hr. PR: F. Man. 211. Relationships between insects and the forest; recognition and control of important species. This course is primarily designed for forestry students.

204. *Principles of Entomology.* I. 4 hr. PR: Biol. 1 and 2 or equiv. Basic course dealing with the anatomy, morphology, physiology, reproduction, systematics, ecology, and control of insects.

210. *Insects Pests in the Agroecosystem.* I. 3 hr. PR: Ento. 204 or consent. Life cycle, damage, and economic impact of pestiferous insects in the agroecosystem. Included are insect pests of agricultural and ornamental plants, stored products, structures, and livestock. 2 lec., 1 lab.

212. *Pest Management.* II. 3 hr. PR: Ento. 204 or consent. An in-depth look at current problems and solutions in controlling insect pests in an environmentally compatible manner. Management techniques include cultural, mechanical, physical, biological, regulatory, and chemical practices. 3 lec.

390. *Special Topics in Entomology.* I, II, S. 2-6 hr. PR: Ento. 204 or consent. Each of the following eight courses is given every other year: Advanced Taxonomy — Exopterygota, Endopterygota Part I, Part II, Larval Taxonomy, Acarology; Economic Entomology — Pest Management, Insect Physiology and Pesticides in the Environment.

Genetics (Gen.)

171. *Principles of Genetics.* I, II. 4 hr. PR: 8 hr. biological science. The fundamentals of inheritance.

290. *Crop Breeding.* II. 3 hr. PR: Gen. 171 or 321. Methods and basic scientific principles involved in improvement of leading cereal and forage crops through hybridization and selection. (*Offered in Spring of even years.*)

321. *Basic Concepts of Modern Genetics.* I. 3 hr. PR: 8 hr. biological science and 1 year chemistry. Independent inheritance, linkage. Chemical nature of genetic material. Control of phenotype by genetic material. Gene action and coding of genetic material.

325. *Human Genetics.* II. 3 hr. PR: Gen. 171 and 321 or consent. Study of genetic system responsible for the development of phenotype in man. (*Offered in Spring of odd years.*)

335. *Population Genetics.* I. 3 hr. PR: Gen. 171 or 321, or consent. Relationship of gene and genotype frequencies in populations of diploid organisms, and effects of mutation, migration, selection, assortive mating, and inbreeding in relation to single gene pairs. Application of these concepts to multigenic inheritance of quantitative traits. (*Offered in Fall of even years.*)

Horticulture (Hort.)

107. *General Horticulture.* I. 3 hr. PR: Biol. 1, Pl. Sc. 52 or consent. Principles underlying present-day horticulture practice with special emphasis on how basic discoveries in plant science have been applied in horticulture.

115. *Judging and Identification of Apple Varieties.* I. 1 hr. Two laboratory periods half of semester. Identification and judging of apple varieties.

116. *Flower Judging.* II. 1 hr. One laboratory period per week. Identification and judging of flowers with emphasis on the aesthetic values which underlie desirability in a variety.

117. *Vegetable Identification and Judging.* I. 1 hr. Identification and judging the common vegetables and the test associated with olericulture in West Virginia. Emphasis is placed on the cultural practices associated with top quality vegetables.

151. *Floral Design.* I. 3 hr. Basic course in flower arrangement to cover occasions for the home and retail flower shop.

162. *Herbaceous Plant Materials.* I. 3 hr. Idenfitication, description, adaptability, and evaluation of the principal kinds and varieties of herbaceous annuals and perennials with emphasis on their use as design elements.

204. *Plant Propagation.* II. 3 hr. PR: Pl. Sc. 52. Study of practices of plant propagation and factors involved in reproduction in plants.

242. *Small-Fruits.* I. 3 hr. (2 lec., 1 scheduled lab.). PR: Pl. Sc. 52, Hort. 107, or consent. Taxonomic, physiological, and ecological principles involved in production and handling of small-fruits. (*Offered in Fall of even years.*)

243. *Physiology of Vegetables.* I. 3 hr. (2 lec., 1 scheduled lab.). PR: Pl. Sc. 52. Physiological and ecological principles involved in production of vegetable crops. (*Offered in Fall of even years.*)

244. *Handling and Storage of Horticultural Crops.* I. 3 hr. (2 lec., 1 scheduled lab.). PR: Pl. Sc. 52, Chem. 16. Characteristics of perishable crops. Methods and materials used to maintain quality. (*Offered in Fall of odd years.*)

245. *Greenhouse Management.* II. 3 hr. PR: Two semesters of Inorganic chemistry and Hort. 107 or consent. Greenhouse as a controlled plant environment. How to manipulate factors influencing plant growth and development within specialized environments of greenhouses.

301. *Post-Harvest Physiology.* II. 3 hr. (1 lec., 2 labs.). Physiology and biochemistry of harvested crops. (*Offered in Spring of odd years.*)

Plant Pathology (P. Pth.)

153. *Forest Pathology.* I. 3 hr. PR: Biol. 2, F. Man. 211. Important diseases of forest and shade trees. Causes and methods of control.

201. *General Plant Pathology.* I. 4 hr. Nature and causes of plant diseases; methods of control.

301. *Diseases of Economic Plants.* I, II, S. 1-3 hr. per sem.; 2 hr in Summer. PR: P. Pth. 201 or 303 or consent. Recognition, cause, and control of diseases of economic plants. Sem. I — Diseases of vegetable crops and of trees and small fruits; Sem. II — Diseases of ornamental plants and field and forage crops; S — Diseases of forest trees. Students may register for 1-3 hr. in Sem. I. and II; 2 hr. in Summer, until 8 hours of credit are accumulated. (*Offered in 1979-80 and in alternate years.*)

302. *Principles of Plant Pathology.* II. 4 hr. PR: P. Pth. 153, 201, or 303, or consent. Primarily for graduate students and seniors majoring in biology, botany, or agricultural science. Nature of disease in plants with practice in laboratory methods. (*Offered in Spring of even years.*)

303. *Mycology.* I. 4 hr. Lectures and field and laboratory studies of parastic and saprophytic fungi.

309. *Nematology.* II. 3 hr. Primarily for graduate students majoring in the agricultural sciences or biology. Nematode taxonomy, bionomics, and control, with particular emphasis on plant parasitic forms. (*Offered in Spring of odd years.*)

Division of Resource Management

Faculty

P. Vernon Armbrester, M.S. (WVU), *Associate Professor of Agricultural Education; Associate Dean, Academic Programs.*

Donald R. Armstrong, M.L.A. (Iowa St. U.), *Assistant Professor of Landscape Architecture.*

Alfred L. Barr, Ph.D. (Okla. St. U.), *Chairman, Division of Animal and Veterinary Sciences; Professor of Agricultural Economics and Agricultural Economist.*
Thomas L. Bean, M.S. (WVU), *Assistant Professor of Agricultural Education and State Safety Extension Specialist — Agricultural Education.*
Russell C. Butler, Ph.D. (Cornell U.), *Professor Emeritus of Agricultural Education and Education.*
James H. Clarke, Ph.D. (U. Minn.), *Professor Emeritus of Agricultural Economics.*
Clifford W. Collier, Jr., M.L.A. (U. Ga.), *Professor and Extension Landscape Architect.*
Dale K. Colyer, Ph.D. (U. Wisc.), *Professor of Agricultural Economics and Agricultural Economist.*
Gloria Dalton, *Drafting Specialist.*
Robert G. Diener, Ph.D. (Mich. St. U.), *Professor of Agricultural Engineering and Agricultural Engineer.*
Gerald V. Eagan, Ph.D. (U. Tenn.), *Associate Professor of Agricultural Economics and State Extension Specialist — Agricultural Economics.*
Kendall C. Elliott, M.S. Ag. E. (WVU), *Associate Professor of Agricultural Engineering and Associate Agricultural Engineer.*
Roy E. Emerson, M.S. (Cornell U.), *Associate Professor Emeritus of Agricultural Engineering.*
Homer C. Evans, Ph.D. (U. Minn.), *Professor Emeritus of Agricultural Economics.*
Marvin R. Fausett, Ph.D. (U. Mo.), *Associate Professor of Agricultural Economics and Field Agricultural Economist, Allegheny Highlands Project.*
Robert A. Fennell, M.L.A. (U. Mass.), *Assistant Professor of Landscape Architecture.*
Anthony Ferrise, M.S. (WVU), *Assistant Professor of Agricultural Economics and State Extension Specialist — Community Development.*
Ernest C. Goff, *Research Assistant in Agricultural Economics.*
Kenneth J. Hock, Ph.D. (U. Ariz.), *Associate Professor of Agricultural Economics and Associate Agricultural Economist.*
Robert L. Jack, Ph.D. (Penn. St. U.), *Professor of Agricultural Economics and Agricultural Economist.*
Warren G. Kelly, Ed.D. (U. Mo.), *Professor of Agricultural Education and Education.*
Marion L. Kimmons, Ph.D. (U. Mo.), *Associate Professor of Agricultural Mechanics.*
John P. Kuehn, Ph.D. (U. Tenn.), *Associate Professor of Agricultural Economics and Associate Agricultural Economist.*
Alon Kvashny, Ed.D. (WVU), *Associate Professor of Landscape Architecture.*
Layle D. Lawrence, Ph.D. (LSU), *Associate Professor of Agricultural Education and Education.*
George W. Longenecker, M.F.A. (U. Ill.), *Professor of Landscape Architecture.*
A. D. Longhouse, Ph.D. (Cornell U.), *Professor Emeritus of Agricultural Engineering.*
Steven B. McBride, M.L.A. (U. Mass.), *Assistant Professor of Landscape Architecture.*
O. Claude McGhee, Ph.D. (Ohio St. U.), *Professor of Agricultural Education and Education.*
Kenneth D. McIntosh, Ph.D. (U. Wisc.), *Professor of Agricultural Economics and Agricultural Economist.*
Robert H. Maxwell, Ph.D. (Cornell U.), *Professor of Agricultural Education; Chief of Party, USAID Mission, Tanzania, East Africa.*
Joseph L. Morris, M.Agr. (WVU), *Assistant Professor of Agricultural Education; Area Director, Morgantown Area, Center for Extension and Continuing Education.*
Ralph E. Nelson, Ph.D. (U. Minn.), *Professor of Agricultural Economics; Vice-Provost, Academic Affairs.*
Ernest J. Nesius, Ph.D. (Iowa St. U.), *Professor Emeritus of Agricultural Economics.*
Paul E. Nesselroad, Ph.D. (Penn. St. U.), *Professor of Agricultural Economics and Agricultural Economist.*
Bruce Nicholas, *Research Assistant in Agricultural Economics.*
Jackie H. Paules, M.S. (Penn St. U.), *Associate Professor of Landscape Architecture.*
Robert S. Pell, *Certified Engineering Technician.*
Leonard M. Sizer, Ph.D. (St. U. Iowa), *Professor of Sociology, Agricultural Scientist and Research Associate, Office of Research and Development.*
Nancy Stout-Wiegand, *Research Assistant in Agricultural Economics.*

Ronald L. Stump, M.S. (WVU), *Dean, Center for Extension and Continuing Education and Director, Cooperative Extension Service; Professor of Agricultural Economics.*
Mary E. Templeton, M.S. (WVU), *Professor of Agricultural Economics and Associate Agricultural Economist.*
George E. Toben, M.S. (U. Ill.), *Professor Emeritus of Agricultural Economics.*
John B. Troy, M.L.A. (U. Mich.), *Assistant Professor of Landscape Architecture.*
F. Wayne Weber, M.S. (WVU), *Assistant Professor of Agricultural Economics and Assistant Agricultural Economist, ERS, USDA.*
Virgil Whetzel, M.S. (WVU), *Assistant Professor of Agricultural Economics and Assistant Agricultural Economist, ERS, USDA.*

Programs

Four curriculums are available within the Division from which students may choose at the baccalaureate level: two in Resource Management and one each in Agricultural Education and Landscape Arthitecture.

Students whose choice is Resource Management are able to emphasize agribusiness, agricultural mechanics, or general agriculture in their programs of study or prepare for graduate study.

Bachelor of Science

RESOURCE MANAGEMENT CURRICULUM

The curriculum of bachelor of science, with its flexible design, will provide the student with the opportunity to acquire the necessary background in mathematics, statistics, computer science, and economic theory and modern concepts of science in preparation for professional or graduate study. Selection of individual courses is the responsibility of the student in consultation with the adviser.

Curriculum Requirements	*Hours*
English composition and rhetoric (or conformity with University English requirements)	6
Physical Education	2
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B) (The student shall elect a minimum of one course in each: History, Political Science, Psychology, and Sociology and Anthropology.)	20
Natural Sciences (Group C) (The student shall elect two courses in Calculus and two in Statistics.)	26
Computer Science	6
Courses in College of Agriculture and Forestry	24
Electives*	32
Total	128

*May elect courses in Military Science (ROTC) or Air Force Aerospace Studies (ROTC).

Bachelor of Science in Agriculture

RESOURCE MANAGEMENT CURRICULUM

A major in Resource Management, developed with a qualified adviser, will provide a student with the opportunity to acquire the necessary background courses for over forty established and basic careers. Considerable latitude is provided to the student for supportive courses in agriculture and other University offerings in planning the curriculum.

Special interest areas falling in this major include: economic development

of communities or rural areas, extension education, farm and agribusiness management, agricultural economics, agricultural mechanics technology, land economics, production economics, marketing, credit and general agriculture.

Curriculum Requirements	*Hours*
English composition and rhetoric (or conformity with University English requirements)	6
Physical Education	2
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C) (Must elect a minimum of 4 hours in Biology, 4 hours in Chemistry, and 3 hours in college Algebra or equivalent.)	12
Foundation requirements in Agriculture (A minimum of 3 hours in each of the following: Animal Science, Plant Science, Soil Science, Agricultural Economics, and Agricultural Mechanics.)	15
Additional courses in Agriculture (This is a minimum credit in agriculture above agricultural courses identified in the foundation requirements in agriculture. These courses may be elected to prepare for special interest areas.)	30
Electives* (Students preparing for selected professional careers of certification need to elect the courses required.)	47
Total	136

*May elect courses in Military Science (ROTC) or Air Force Aerospace Studies (ROTC).

Bachelor of Science in Agriculture

AGRICULTURAL EDUCATION CURRICULUM

The main purpose of agricultural education is to educate those who would be teachers of vocational agriculture.

An effective vocational agriculture teacher can assist in the economic and social development of a community. One can accomplish this by teaching a total program of vocational agriculture, in and through the high school. Day, young farmer, adult farmer, and off-farm agricultural occupations classes and groups, taught through supervised occupational experience programs, are the tools with which the vocational teacher helps build a more desirable community.

Curriculum Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A)	12
Social and Behavioral Sciences (Group B)	12
Natural Sciences (Group C included) (Must elect a minimum of 8 hours in Biology; 8 hours in Chemistry; 3 hours in college Algebra or equivalent.)	24
Courses in Agriculture	45

Elect a minimum of 3 hours in each of the following:

1. Animal Science
2. Plant Science
3. Soil Science
4. Agricultural Economics

Elect additional courses to obtain the total of 45 hours in Agriculture.

Physical Education	2
Free Electives*	35
Total	136

*May elect courses in Military Science (ROTC) or Air Force Aerospace Studies (ROTC).

Students pursuing this program will meet requirements for certification by the West Virginia Department of Education. The program provides students with the opportunity to become qualified to teach in the broad field of vocational agriculture as well as to become especially prepared to teach in agricultural production and management, animal processing, agricultural mechanics, agricultural sales and services, conservation, horticulture produce industry, or ornamental horticulture. Courses are also offered in extension education for any University student planning for a career in cooperative extension.

A student selecting the comprehensive field for vocational agriculture teaching shall complete the above listed curriculum requirements. It is also suggested that each student choose one of the seven options listed below to guide the student's program of study.

Students enrolled in this curriculum are advised to refer to the section of the *Undergraduate Catalog* entitled: "Programs for Secondary School Teachers" in the Department of Curriculum and Instruction, College of Human Resources and Education:

	Hours
A. Agricultural Production and Management	17
B. Animal Processing	17
C. Agricultural Mechanics	17
D. Agricultural Sales and Service	17
E. Conservation	17
F. Horticulture Produce Industry	17
G. Ornamental Horticulture	17

Bachelor of Science in Landscape Architecture

LANDSCAPE ARCHITECTURE CURRICULUM

The profession of landscape architecture offers the opportunity to be involved in improving the quality of the environment. The profession deals with the planning and sensitive design of land areas for the utility of man and the esthetic enrichment of man's needs. This may range from the planning and design at the regional macro-scale to the urban micro-detail.

The primary educational goals of the curriculum are:

To prepare students who are professionally proficient and technically competent in the design of outdoor spaces for social interaction.

The education of students regarding the natural factors which influence the form and kind of development of use areas.

To introduce the students to the principles of land planning at all scales of development.

The curriculum exposes the student to a wide range of environmental design problems related to the satisfaction of man's social and physical needs. The program emphasizes the understanding of relationships between the natural and social systems and their manifestations in physical design form.

Curriculum Requirements	*Hours*
English Composition and Rhetoric (or conformity with University English requirements)	6
Arts and Humanities (Group A) (A minimum of 6 hours in Art and 3 hours in Speech Communication.)	12
Social and Behavioral Sciences (Group B) (To include a minimum of 3 hours in each of three of the following: Multidisciplinary Studies, Geography, Sociology and Anthropology, and Psychology.)	12
Natural Sciences (Group C) (To include Biol. 1 or equivalent. Inorganic Chemistry and Math. 3 and 4 or 14; Calculus may be substituted for the mathematics requirement.)	12
Physical Education	2
Engineering Sciences — (to include Surveying)	4
Selected Electives in Agriculture and Forestry	15
Elect minimum of 3 hours in at least four areas listed below:	
1. Agricultural Economics/Agricultural Education	
2. Horticulture	
3. Agronomy/Plant Sciences	
4. Agricultural Mechanics	
5. Forestry/Recreation & Parks	
Courses in Landscape Architecture*	48
Electives	25
Total	136

*In addition each student will be required to work for at least one summer or its equivalent in an approved Landscape Architecture office.

Of the 48 hours required for a Bachelor of Science in Landscape Architecture, the following courses, or their equivalent, are required: L. Arc. 20, 21, 50, 51, 131, 132, 140, 141, 150, 151, 250, and 251.

Courses of Instruction

Resource Management (Res. M.)

1. *American Food and Agricultural Industry.* I. 3 hr. Examination of the structure, function, and importance of the food and agricultural industry in the United States.

180. *Assigned Topics.* I, II, S. 1-4 hr. In order to be eligible to register in Assigned Topics, the student must: (1) be in good standing, and (2) obtain approval of the Division before registration.

Agricultural Economics (Ag. Ec.)

(Economics 51 or 54 is required as a prerequisite for all courses in Agricultural Economics numbered 100 or above.)

10. *Agribusiness Accounting.* I. 4 hr. Accounting for business maanagers who do not intend to become accountants. (Students having prior college credit in accounting are not eligible for this course.) A brief coverage of terminology and methodology; decisions in accounting as directed by executives; interpretations and values from accounts and accounting statements.

104. *Farm Management.* I. 3 hr. Principles in assembling, analyzing, and using farm business records; the use of budgeting in evaluating alternatives.

200. *Land Economics.* II. 3 hr. Classification, development, tenure, use, conservation, valuation, and taxation, of rural, urban, mineral, forest, water, and recreational

land resources. Private and public rights in land and the effect of population on the demand for land.

206. *Farm Planning.* I. 3 hr. PR: Senior standing. Planning use of labor, soil, crops, livestock, buildings and equipment; principal factors influencing returns on farms. Farm visits required.

211. *Rural Economic Development.* I or II. 3 hr. Resource utilization, economic behavior and economic systems and subsystems, trade, public revenue and its allocation, distribution of income, manpower problems, development policies, and regionalization in rural areas.

231. *Marketing Agricultural Products.* I or II. 3 hr. Market organization, policies, practices, and factors affecting the marketing of agricultural products. Tour of market agencies and facilities in Pittsburgh area required.

235. *Marketing Dairy Products.* II. 2 hr. Milk-marketing policies and practices, including milk-market orders. (*Offered in Spring of odd years.*)

240. *Agricultural Prices.* I or II. 3 hr. Analysis of price-making forces which operate in the market places for the major agricultural commodities.

261. *Agribusiness Finance.* II. 3 hr. Credit needs for agricultural businesses, financing farm and market-agency firms, and organization and operation of credit agencies which finance agricultural business firms.

271. *Agricultural Policy.* II. 3 hr. Examination of economic aspects of governmental price programs, production and marketing controls, subsidies, parity, export and import policies, and other programs affecting agriculture.

330. *Cooperative Organization.* II. 3 hr. Organization, functions, and contributions of cooperatives in an economic system. (*Offered in Spring of even years.*)

342. *Advanced Agricultural Economics.* I. 3 hr. Current policies, problems, and programs affecting agricultural development and food production and distribution in developing countries and the United States with emphasis on analysis of projects. (*Offered in Fall of even years.*)

355. *Resource Analysis.* I. 3 hr. PR: Senior standing. Construction of models consistent with economic reality for allocating the factors of production available on farms, in forests, and in non-farm agricultural businesses to produce profit maximizing plans through use of linear and dynamic programming and electronic equipment.

Agricultural Education (Ag. Ed.)

160. *Materials for and Method of High School Teaching of Vocational Agriculture.* I. 3 hr. PR: Consent. Organization and preparation for teaching vocational agriculture in and through the high school. (*Also listed as C&I 160.)*

162. *Group Organization and Leadership.* I. 2 hr. PR: Consent. Principles and techniques involved in forming, structuring, developing, and directing organizations for effective professional leadership.

188. *Student Teaching.* I, II. 8 hr. PR: C&I 7, Ed. P. 105 and 106. (*See C&I 188 requirements.)*

260. *Principles of Cooperative Extension.* I. 2 hr. PR: Consent. Background, philosophy, and history of cooperative extension. Activities of county cooperative extension agents and cooperative extension programs in West Virginia. (*Offered in Fall of even years.*)

261. *Methods and Materials in Extension Education.* II. 2 hr. PR: Consent. Organization and preparation for extension teaching and the processes of communication. *(Offered in Spring of odd years.)*

263. *Teaching Young, Adult Farmer, and Off-Farm Agricultural Occupations Classes.* I. 2 hr. PR: Ed. P. 105, 106 or consent. Participation in conducting young farmer,

adult farmer, and off-farm agricultural occupations classes; organization, course of study, method in teaching, and supervision of classes, young farmers' associations, adult farmers' organizations, and off-farm agricultural occupations organizations. (*Also listed as C&I 263.*)

264. *Cooperative Vocational Education.* II. 4 hr. PR: Consent. Preparation for planning, organizing, and conducting high school programs of cooperative vocational education, and familiarization with business organization and operation. *(Also listed as C&I 264.)*

362. *Program Building in Cooperative Extension.* II. 3 hr. PR: Consent. Organization in relation to program building. Leadership and group action. Overall working and educational objectives, principles, method, and goals in developing county extension programs. *(Offered in Spring of even years.)*

364. *Organizing and Directing Supervised Farming and Supervised Occupational Experience Programs.* S. 2 hr. PR: Ag. Ed. 160 or consent. Planning programs of supervised farming and supervised occupational experience, supervising and evaluating such programs for day students, young farmer, adult farmer, and off-farm occupations classes and groups. *(Also listed as C&I 364.)*

Agricultural Mechanics (Agr. M.)

10. *Principles of Agricultural Mechanics.* I. 3 hr. A study of the development of mechanized production and processing together with the impact of such mechanization on environment, utilization of natural and renewable resources, pollution, and their effect on ecology. 3 hr. rec.

152. *Shop Theory and Methods.* I, II. 3 hr. Seven areas of basic shop work: carpentry, cold metal work, hot metal work (forge, electric and gas welding), sheet metal (soldering, forming, cutting, riveting), tool care, and plumbing. 1 hr. rec., 6 hr. lab.

253. *Advanced Farm Machinery.* I. 3 hr. Principles and operation of machinery for agriculture and forestry. Emphasis on safety and environmental impact. 2 hr. rec., 3 hr. lab.

259. *Farm Structures.* II. 3 hr. Study of structures required for agriculture, family housing and storage. Planning, layout, materials, ventilation, insulations, construction techniques, remodeling, and impact upon environment. 2 hr. rec., 3 hr. lab.

270. *Electricity in Agriculture.* II. 3 hr. Study of production and safe use of electricity for home and agriculture. Emphasis on approved wiring practices, motors, and electrical controls and their applications in lighting, heating, refrigeration, air conditioning, water supply, and processing. 2 hr. rec., 3 hr. lab.

275. *Agricultural Engines.* II. 3 hr. Study of power sources (gasoline, diesel, turbine, wankel, etc.) for agriculture and forestry. Operation, selection, maintenance techniques, and emissions impact on power and fuel efficiency. 2 hr. rec., 3 hr. lab.

352. *Advanced Farm Mechanics.* S. 3 hr. PR: Agr. M. 152. Development of advanced skills with hand and power tools. Areas of emphasis dependent upon needs of individual students. Care and maintenance of power tools and shop organization and planning are essential parts of this course. 1 hr. rec., 6 hr. lab. (*Offered in Summer, 1979.*)

Landscape Architecture (L. Arc.)

5. *Introduction to Landscape Architecture.* I or II. 1 hr. (Open to all WVU students.)

20. *Landscape Architectural Drafting 1.* I. 3 hr. (For majors only.) Introduction to landscape architectural drafting.

21. *Landscape Architectural Graphics 2.* II. 3 hr. (For majors only.) PR: L. Arc. 20 or equiv. Introduction to various media and techniques for landscape architectural graphic presentation in two- and three-dimensional expression.

40. *Woody Landscape Plants 1.* I. 3 hr. PR: Biol. 1 or equiv. Laboratory and field study of deciduous ornamental woody plants and their suitability for landscape compositions.

41. *Woody Landscape Plants 2.* II. 3 hr. PR: L. Arc. 40 or consent. Laboratory and field study of evergreen ornamental woody plants and their suitability for landscape compositions.

50. *Theory of Landscape Architectural Design.* I. 3 hr. PR: L. Arc. 21 or equiv. Application of elements and principles of art and design to landscape architecture.

51. *Landscape Architectural Design.* II. 3 hr. PR: L. Arc. 50 or equiv. Investigation and application of various design factors which play a role in design of natural and man-made environment.

112. *History of Landscape Architecture.* I. 3 hr. PR: Consent. A broad survey of the history of the designed human environment with emphasis on the development of landscape architecture.

131. *Landscape Architectural Construction 1.* I. 4 hr. PR: C.E. 1 or 5 or equiv.; Math. 3 and 4 or 14 or equiv. The study of the technical principles of grading design, their application to site planning, and preparation of land form grading plans.

132. *Landscape Architectural Construction 2.* II. 4 hr. PR: L. Arc. 131. Study and preparation of parkway plans (road alignment), surface and sub-surface drainage plans, advanced grading plans, and cost estimates.

140. *Planting Design 1.* I. 3 hr. PR: L. Arc. 40 and 41 or equiv. The use of plants in design with emphasis upon ecological and aesthetic applications.

141. *Planting Design 2.* II. 3 hr. PR: L. Arc. 140 and Agron. 2 or 10. Continuation of L. Arc. 140 with special emphasis on planting techniques, planting and seeding specifications, and landscape materials for implementing the design.

150. *Landscape Architectural Design 1.* I. 5 hr. PR: L. Arc. 51. Design problems involving private, semi-public and public areas with emphasis on site analysis, details, and presentation. Site design problems are integrated with landscape architectural construction and planting design courses.

151. *Landscape Architectural Design 2.* II. 5 hr. PR: L. Arc. 150.

229. *Landscape Architecture.* I. 3 hr. (For non-majors only.) An appreciation of the basic principles of design and information pertaining to the use of ornamental plants around the home.

248. *Design Analysis.* II. 2 hr. PR: Consent. Analysis of planning and design projects to offer solutions to a given problem. (*Offered in Spring of odd years.)*

250. *Advanced Landscape Architectural Design 1.* I. 6 hr. PR: L. Arc. 132 and 151. Advanced landscape design of semi-public and public areas involving comprehensive problems and in-depth individual and team study.

251. *Advanced Landscape Architectural Design 2.* II. 6 hr. PR: L. Arc. 50. Continuation of L. Arc. 250, culminating in a comprehensive final design project.

265. *Regional Design.* II. 3 hr. PR: Consent. Consideration of regional landscapes in order to effectively relate design to the ecology and development of a region. (*Offered in Spring of odd years.*)

276. *Recreation Planning.* I, II. (I—L. Arc. majors only; II—Non-majors only.) 3 hr. PR: Consent. Design of park and recreation areas involving park history, classification theory, and administration.

284 *Professional Practice.* II. 3 hr. PR: Consent. Procedures in preparation of contract documents, fees, estimates, operation of an office, and relationship to clients and contractors.

College of Arts and Sciences

William E. Collins, Ph.D. (U. Wisc.), *Dean of the College; Professor of Biology.*
Martha C. Howard, A.M. (U. Mich.), *Associate Dean; Associate Professor of English.*
Charles W. Connell, Ph.D. (Rutgers U.), *Assistant Dean; Associate Professor of History.*
Nicholas G. Evans, M.A. (WVU), *Assistant to the Dean; Assistant Professor of English.*

The primary mission of the College of Arts and Sciences is to promote the full development of the student as an individual and as a member of society. Students earning degrees in Arts and Sciences fulfill certain broad basic-education requirements and study at least one subject in some depth; in addition, they have an opportunity to incorporate a number of electives into their programs of study. The degree requirements in Arts and Sciences are, in part, intended to carry forward what is usually termed "a general education," thus providing a foundation for continued growth and development after graduation.

Ideally, the student should develop intellectually, spiritually, physically, and emotionally. The goal of such development should be an inner balance or stability on the basis of which further growth can take place. The student should develop the capacity for intellectual participation as a citizen in the community, state, country, and world. A general education should, therefore, provide for all students an experience appropriate both to individual self-understanding and the social needs which all people have in common.

Clearly, one purpose of a college education is to help students acquire knowledge and skills both for self-fulfillment and in preparation for the roles they will subsequently play in society. A less obvious but equally important purpose is to impart certain attitudes to students. In the interest of fulfilling both purposes, the College of Arts and Sciences strives to help students acquire the specific attributes listed below:

Knowledge

1. A knowledge of the main principles, facts, concepts, and theories in one's major area of concentration.

2. A knowledge of Western and non-Western civilizations: Their distinctive characters (belief systems, languages, intellectual and artistic contributions), and their origins, development, and present states.

3. A knowledge and appreciation of the environment in which one operates (physical, biotic, social, technological, aesthetic), including knowledge of change processes (evolutionary, technological, social, intellectual) and knowledge of past adaptations as a basis for predicting the consequences of contemporary actions and changes.

4. A knowledge and appreciation of the arts, of their humanizing and energizing effects, and of one's connection with the arts through one's impulses toward creativity.

5. Acquaintance with the various technical languages (statistics, linguistics, etc.) that are increasingly necessary to understand the major approaches in the sciences and humanities.

Skills

1. Skills in the sophisticated techniques of one's major area of concentration, sufficient for the individual to use that skill with respect for quality of endeavor, imagination, creativity and social responsibility.

2. Skills in communication using a variety of channels including writing, speaking, reading, listening, and viewing.

3. Skills in analyzing and solving problems by recognizing ambiguities, using proper logic, marshalling pertinent facts and arguments, and using mathematical techniques where appropriate.

4. Skills in the use of the imaginative and synthetic process of mind, including innovative thinking, and recognition of the connections among a variety of intellectual frameworks and matrices.

5. Skills involved in decision-making, including the ability to recognize alternatives, project consequences, and assume the responsibility for making decisions.

Attitudes

1. An attitude of dispassionate self-appraisal, based upon an understanding of one's own nature and characterized by an awareness of one's own strengths and weaknesses.

2. An attitude of open-mindedness, permitting one to see beyond the limits of one's own occupation, economic status, language, and culture, and including a respect for opinions different from one's own.

3. A willingness to recognize and respect ethical obligations and the rights of others.

4. A commitment to truth-seeking characterized by objectivity, utilization of evidence, intellectual curiosity, and the search for wisdom.

Enrollment

Three classes of students enroll in the College of Arts and Sciences: students working toward a degree in the College of Arts and Sciences; those pursuing a preprofessional curriculum in anticipation of earning a bachelor's degree in a professional school; and special students who are not degree candidates.

Admission to or completion of a preprofessional curriculum does not constitute admission to a professional school at WVU. (See "Admission to Medical Center Programs," page 14, and the appropriate *Catalog* sections describing admission to the professional school in question.)

Students who have earned fewer than 58 hours of credit and have not entered a degree program are classified as lower-division students in the College. During the semester in which they will complete 58 or more hours of course work, students in Arts and Sciences should apply for admission to degree programs in the college or department in which they intend to earn their degree. In the case of interdepartmental degree programs, applications should be made to the Chairperson of the Interdepartmental Major Committee. If a student has not been admitted to a degree program by the time of completion of 70 hours of course work, the student will not be permitted to re-enroll in the College of Arts and Sciences.

NOTE: Minimum and Maximum Load. A minimum of 12 hours in a semester is required for full-time status in Arts and Sciences. No student enrolled in Arts and Sciences may enroll for more than 19 hours in a semester without permission from the Committee on Academic Standards.

Admission to Arts and Sciences Degree Programs

Minimal College of Arts and Sciences requirements for regular admission into degree programs are completion of 58 hours of course credit, a 2.0 overall average, and a 2.0 average in courses already completed in the discipline of the degree program to which the student is applying. Specific degree programs may have additional requirements.

Students may be admitted to degree programs in the College of Arts and Sciences in two distinct categories:

1. *Regular Admission.* Student has met all College of Arts and Sciences and degree program requirements.

2. *Provisional Admission.* Student has completed 58 hours but has not yet met all College of Arts and Sciences and/or degree program requirements for entrance into the specific program. It should be stated in writing, by the department offering the degree program, the provisional terms under which the student is accepted, making clear the deficiencies the student must remove and the date by which such removal must be accomplished. Failure on the part of the student to remove deficiencies by the stipulated date will result in suspension from the degree program.

Students planning to qualify for teacher certification as well as for an Arts and Sciences degree should check with their advisers and the *Catalog* statement (College of Human Resources and Education) to determine the requirements for such certification.

Complete information concerning WVU admissions, registration, fees and expenses, and regulations may be found in Part 2 of the *Undergraduate Catalog:*

Admission to Degree Programs in Colleges and Schools Other Than Arts and Sciences

Students planning to apply for admission to degree programs in other WVU colleges and schools should check the *Catalog* statements of those schools to determine the specific admission requirements. Students who have not been admitted into another college or school by the time they have earned 70 hours of credit cannot re-enroll in the College of Arts and Sciences unless they have been admitted into a degree program in the College of Arts and Sciences.

Degree Programs

The following degree programs are offered:

Biology	Geography	Physics
Chemistry	Geology	Political Science
Computer Science	History	Psychology
Economics	Interdepartmental Major	Sociology and Anthropology
English	Mathematics	Speech Communication
Foreign Languages	Philosophy	Statistics

Although some degree programs, such as optometry and architecture, are not offered by WVU, students may initiate degree programs under the auspices of the Academic Common Market (see page 22). Normally, students would enroll for their first year or more at WVU and establish an academic record, and

then submit application for transfer to the out-of-state institution. Additional information is available at the Academic Advising Center.

Board of Regents Bachelor of Arts Degree

Especially designed for the adult, the Board of Regents Bachelor of Arts Degree offers students the opportunity to gain credits for work and life experience (college equivalent credit).

Degree Requirements — Total credits: 128; Upper-Division credits: 40; General Education: 36, including: Communications: 6; Humanities: 6; Natural Sciences: 6; Social Sciences: 6.

Admission — Admission requirements are the same as for other WVU degree programs except students are not eligible for admission until four years after graduation from high school.

Fees — Tuition and fees are the same for the Regents B.A. Program as for other WVU degree programs except for the evaluation fee for life and work experiential learning assessment.

Detailed information is available from: Coordinator, Board of Regents B.A. Degree Program, WVU Student Services Center.

Interdepartmental Majors

Interdepartmental major programs involve concentrated study in more than one department in the College of Arts and Sciences or the University. These programs, which lead to the degree of Bachelor of Arts degree are of three kinds:

Individualized Major Program: Designed for the student who wants to arrange an individually tailored program to meet educational aims not met by any departmental program in the College of Arts and Sciences or the University. An individual program usually involves study in two or three academic departments and the program should be planned so that the student attains academic depth matching that of a traditional major.

Specially Designated Area Programs: (A) *Appalachian Studies* — designed to allow students to understand the growing body of knowledge about the problems and culture of the Appalachian region. Courses are chosen from a selected list in several departments including Biology, Economics, English, Forestry, Geography, Geology, History, Music, Political Science, Sociology and Anthropology, and Social Work. (B) *Comparative Literature* — designed to give the student an appreciation and understanding of American, British, and world literature. Courses are chosen from a selected list in the English and Foreign Languages departments. (C) *Musical Arts* — designed to provide a curricular option for the student with an interest in music who wishes to pursue a broad, liberal arts education rather than to seek a career as a performer or teacher. An audition is required for admission to the program. (D) *Slavic Studies* — designed to provide the student with knowledge and understanding of the Soviet Union and its people. Courses are chosen from a selected list in the departments of Foreign Languages, Geography, History, Political Science, and Sociology and Anthropology.

The Liberal Arts Major: Designed for those students not wishing to specialize in a particular discipline such as chemistry or history but desiring a liberal education, offering breadth, depth, and coherence. Courses are selected to give the student such experience in the areas of mathematics and natural science, social science, and the humanities.

Any student is eligible to apply for admission to the interdepartmental major program. Ideally, the student should seek admission to the program during the sophomore year; however, any student may consider adoption of the program at any point in the academic career provided the requirements of the program, the College of Arts and Sciences, and the University can still be met. Additional information is available through the Academic Advising Center.

Double Major

A student may earn a degree in more than one degree program if the student is officially accepted into each program and satisfies the requirements of each program.

Honors Program

With the cooperation of the departments the Honors Program of WVU exists to recognize, encourage, and provide opportunities for developing qualities of intellectual and academic excellence among the superior students of WVU.

To achieve these goals the Honors Program seeks: (1) to identify superior students; (2) to provide them with Honors courses and Honors sections of regular courses which meet the requirements of the University Core Curriculum and offer a quality of excellence to enrich the student's learning in more personalized and usually smaller classes; (3) to encourage departments to offer departmental honors programs enabling their better majors to undertake independent study and advanced research in close cooperation with the faculty; and (4) to provide for all gifted students in the University information on grants, fellowships, and scholarships for graduate and professional programs.

In the Honors Program the better students are encouraged to develop their own individual talents and to become more creative participants in their own education. They also have the opportunity to think more, accomplish more, write more, and talk more.

A student in the Honors Program normally takes one honors course each semester of the student's first two years. These courses also help to fulfill the requirements of the University Core Curriculum. Experiences in the junior and senior year depend largely upon the student's major department.

Admission to the Honors Program may be obtained in several ways: (1) Incoming freshmen who have applied for admission to the Honors Program by filling out the application form on page 4 of WVU's "Application for Freshman Admission" may be admitted on the basis of ACT scores, high school grades, and class standing in high school; (2) a student who has a cumulative grade-point average of 3.4 or higher at the end of the freshman year can join by invitation or application; (3) a student transferring to WVU from another college with a cumulative grade-point average of 3.5 or above will be admitted upon application; and (4) by recommendation of a faculty member or a member of the Honors Program, a student will be admitted upon approval of the Honors Council. Any student whose cumulative grade-point average falls below 3.00 for two consecutive semesters will be dropped from the program.

Students in the Honors Program will have a designation on their permanent records indicating: (1) the date of admission to the Honors Program; (2) those Honors courses and Honors sections of regular courses which have been completed; and (3) upon graduation one of the following statements added to *"Cum Laude," "Magna Cum Laude," or "Summa Cum Laude"* following completion of the requirements of the Honors Program: (a) *Citation in the General*

Honors Program; (b) *Citation in the Departmental Honors Program;* and (c) *Citation in the General and Departmental Honors Programs.*

To qualify for *"Citation in the General Honors Program"* the student must: (1) complete 11 or 12 hours of Honors courses or Honors sections of regular courses or other courses, such as Independent Study, Special Topics, and Reading Courses, which are regarded by the offering departments as representing Honors experience. At least 9 hours must be in subjects other than the student's major; (2) satisfy requirements of the junior year project; this may be reading, research, service, or travel; (3) achieve an academic average high enough to qualify for *Cum Laude, Magna Cum Laude or Summa Cum Laude,* as defined elsewhere in the *WVU Undergraduate Catalog.*

To qualify for *"Citation in the Departmental Honors Program"* the student must have been certified by the department of the student's major as having satisfied the requirements formulated by that department as well as achieving an academic average high enough to qualify for *Cum Laude, Magna Cum Laude,* or *Summa Cum Laude* as defined by the *Catalog.*

To qualify for the *"Citation in General and Departmental Honors Programs"* the student must fulfill the requirements of both of the above.

Credit by Examination

Any student may petition to receive credit by examination for any course listed by a department as one for which credit by examination is awarded. Applications, course lists, and examination schedules are available at the Academic Advising Center of the College of Arts and Sciences.

A student may apply for such credit in a course if: (a) the student is at the time of examination registered in the University; (b) the student's official record does not show credit for the course the student wishes to take by examination (i.e., any grade of S, P, D, C, B, A, or I); (c) the student is not officially enrolled in the course at the time of the examination. (A student who withdraws from a course after the end of the official registration period is officially enrolled in that course until the end of the semester in which the course was elected.)

Regulations Affecting Degrees

Application for Graduation and Diploma

All candidates for degrees in the College of Arts and Sciences must fill out an application for graduation and diploma at the Office of the Dean. Candidates should make such application during the second semester of their junior year in order to have their records evaluated as to College and University requirements. Application *must* be made during the first month of the semester or session in which the candidate expects to be graduated. If a student does not, for some reason, graduate on the date for which the student applied initially, the student must re-apply for a later date. No candidate can be graduated without application.

Bachelor of Arts Degree

The degree of Bachelor of Arts in the College of Arts and Sciences is conferred upon a student who complies with the general regulations of WVU con-

cerning degrees and satisfies all entrance, college, and departmental requirements.

Bachelor of Science Degree

The degree of Bachelor of Science is conferred upon a student who complies with the general regulations of WVU concerning degrees, satisfies all entrance and college requirements, and completes the requirements for the Bachelor of Science degree in one of the following fields: Chemistry, Computer Science, Geology, Physics, and Statistics.

Second Bachelor's Degree

A student who has received a bachelor's degree in one department or college of WVU may become eligible for a second bachelor's degree by earning an additional 30 semester hours in residence in the College of Arts and Sciences and meeting all requirements, departmental and otherwise, of the second bachelor's degree.

Requirements for Degrees

In order to qualify for graduation, students must fulfill the University requirements stipulated in Part 2 of the *Undergraduate Catalog*, as well as college and degree program requirements:

College Requirements

A. *Foreign Language:* Two years of study in one language. The student may satisfy this requirement by taking courses 1, 2, 3, and 4, or other approved courses, in one language. Students who present two or more units of high school credit in a foreign language may satisfy this requirement by taking courses 3 and 4, or other approved courses, in that language. Such students may elect to take courses 1 and/or 2 as additional preparation for courses 3 and 4. (For explanation of various options and other approved courses, see listings under "Foreign Languages" in the *Undergraduate Catalog.*) Courses used to fulfill this requirement are *in addition to* those used to fulfill the University Core A requirement.

B. *Mathematical Science:* Each student must satisfactorily complete a minimum of 3 semester hours in the mathematical sciences — mathematics, statistics, or computer science. Courses used to fulfill this requirement may simultaneously be used to fulfill the University Core C requirement.

C. *Laboratory Science:* Each student must satisfactorily complete at least one laboratory course in a Core C field *other than* mathematics, statistics, or computer science. The College strongly recommends a full year in one science. Courses used to fulfill this requirement may simultaneously be used to fulfill the University Core C requirement.

D. *Fine Arts:* Each student must satisfactorily complete a minimum of 3 semester hours focused on the fine arts — art, literature, music, theatre, etc. Courses used to fulfill this requirement are *in addition to* those used to fulfill the University Core A requirement. A list of acceptable courses is available at the Academic Advising Center, the Office of the Dean, and from departmental advisers.

E. *International Studies or Minority Studies:* Each student must satisfactorily complete 3 semester hours of study of a foreign culture or civilization other

than that of Modern Western Europe or Canada, or 3 semester hours of study of a minority culture in the United States or Canada. This requirement may be used simultaneously to satisfy core requirements, but no course used to satisfy the foreign language requirement may be used to fulfill this requirement. A list of acceptable courses is available at the Academic Advising Center, the Office of the Dean, and from departmental advisers.

F. *Electives:* As approved by the adviser, to complete the minimum number of hours required for graduation.

G. *Grade-Point Average:* A cumulative average of 2.0 is required for graduation.

Degree Program Requirements

A. *Major Subject:* Requirements are listed separately in the *Catalog* by department or degree program. To establish a major sequence and to qualify for graduation, the student must have spent at least two semesters and have accumulated a minimum of 30 semester hours as a student in a degree program.

B. *Transfer Credit:* Except with the approval of the department or degree program chairperson, no upper-division course in the major, taken at another institution, will be counted toward meeting the requirements of the degree program.

C. *Grade-Point Average:* Individual departments or degree programs may require a grade-point average of 2.0 (C) or higher in the major, or a grade of C or higher for certain specified required courses.

D. *Credit Hours:* A total of 128 hours is required for the Bachelor of Arts degree. The Bachelor of Science degree in Computer Science, Geology, and Statistics requires 134 hours; in Chemistry and Physics, 136 hours.

Credit Limitations

The following may *not* be counted toward the hours required for graduation:

A. Math. 0, 1, 2.

B. Courses in which the grade received is other than A, B, C, D, P, or S. Credit by examination, however, is counted toward hours required for graduation unless it was granted for courses otherwise excluded in this list.

C. Any course passed more than once, unless a course is designated as repeatable and is so described in the *Catalog.*

D. More than 42 hours in one departmental subject for a Bachelor of Arts degree. (In the case of English language and literature, the 42-hour maximum is exclusive of credits in English 1 and 2.) As much as 60 hours may be presented from a department that offers more than one subject (e.g., Foreign Languages).

E. More than 8 hours of first- and second-year Military Science (ROTC) or Air Force Aerospace Studies (ROTC) courses.

F. More than 6 hours of third- and fourth-year Military Science (ROTC) or Air Force Aerospace Studies (ROTC) courses.

G. More than 72 hours of transfer credit from accredited junior or community colleges.

H. More than 18 semester hours of credit for which only a grade of P is recorded. (See Pass-Fail Grading, page 38.)

I. Any course in which the final grade is F. The student must take the course again *in residence at WVU* if the student desires to receive credit for it.

Preparation for the Study of Dentistry, Law, or Medicine

Some students preparing for the study of dentistry or medicine may satisfy the requirements for entrance into dental or medical school by majoring in any Arts and Sciences subject and including in their undergraduate course selections the following minimum requirements or their equivalents: general biology with laboratory (2 semesters); inorganic chemistry with laboratory (2 semesters); organic chemistry with laboratory (2 semesters); introductory physics with laboratory (2 semesters); and social or behavioral sciences (2 semesters). These requirements overlap those of the University Core Curriculum, which must be satisfied by all students. All degree programs in Arts and Sciences offer a major which accommodates the above courses. Some students are admitted to a school of dentistry or medicine after completing three years of undergraduate work. These students may earn the bachelor's degree by completing three years in Arts and Sciences and one year in a dental or medical school. In some cases, courses taken in the first year of dental or medical school may be credited to the degree program in Arts and Sciences.

Admission to or completion of a preprofessional curriculum does not constitute admission to a professional school. (See "Admission to Medical Center Programs," page 14, and the appropriate *Catalog* sections describing admission to the professional school in question.)

No specific program of pre-law education is prescribed. Courses of study which demand intellectual self-discipline are encouraged. The ability to speak and write clearly, ordering thoughts intelligently, and using language accurately is highly desirable. Some background in accounting is helpful in understanding complex tax and corporate structure matters.

Bureau for Government Research

The Bureau for Government Research makes studies of problems of state and local government, provides consulting assistance to West Virginia governments, presents training programs for government officials, and issues publications periodically. In addition to its own staff, the Bureau relies upon political science and public administration faculty and public officials throughout the state for research data and manuscripts for publications. The Bureau publishes a quarterly newsletter, *The West Virginia Public Affairs Reporter*. The Bureau also maintains a research library for its staff and other faculty, graduate, and undergraduate students.

Staff

David A. Bingham, Ph.D. (St. U. Iowa), *Director*.
O. B. Conaway, Jr., Ph.D. (Syracuse U.), *Research Associate*.
Dennis R. Goldenson, Ph.D. (U. Minn.), *Research Associate*.

Courses of Instruction and Curricula

Honors (Hon.)

89. *Students and the University*. I. 3 hr. PR: Honors students and others with a 3.3 grade-point average. The course is intended to increase the student's understanding and knowledge of the University's origins and development. Focus is upon University students at selected points in history.

Orientation (Orien.)

1. *Orientation.* I. 1 hr. Open only to new students in their first semester at the University. Study of the values, orientation, and emphases which characterize higher education and an explanation of the nature of a university and its role. *(Pass-Fail grading only.)*

51. *Career Series — Career Planning Exploration.* I, II. 1 hr. Exploration of careers with special emphasis on individual interests, abilities, and values. Most beneficial to freshmen and sophomores, but appropriate for juniors and seniors. *(Pass-Fail grading only.)*

52. *Career Series — Job Search.* I, II. 1 hr. PR: Orien. 51 recommended. Methods of looking for a job — employer expectations, interviewing, résumés, letter writing, etc. Should be taken next to last semester, but can be taken at other times. *(Pass-Fail grading only.)*

150. *Orientation to Law.* I, II. 1 hr. An orientation to the legal profession for undergraduates. Undergraduate preparation for law school; Law School Admissions Test (LSAT); admission to law school, law school experience and the legal profession. *(Pass-Fail grading only.)*

191. *Orientation.* I, II. 1 hr. PR: Sophomore or higher standing and consent. Students will participate in Orien. 1 as assistants to faculty teaching Orien. 1. Practicum form of study leading to an understanding of the values, orientations, and emphases which characterize higher education. *(Pass-Fail grading only.)*

Biology

Faculty

John J. DeCosta, Ph.D. (Ind. U.), *Chairman and Professor.*
Robert D. Allen, Ph.D. (UCLA), *Associate Professor of Biology.*
Nelle P. Ammons, Ph.D. (U. Pitt.), *Professor Emerita of Botany.*
Charles H. Baer, Ph.D. (U. Md.), *Professor Emeritus of Biology.*
Jay Barton II, Ph.D. (U. Mo.), *Professor of Biology; Vice President and Provost for Academic Affairs.*
Herald D. Bennett, Ph.D. (U. Iowa), *Professor of Biology.*
Arnold Benson, M.A. (U. Colo.), *Assistant Professor of Biology.*
David F. Blaydes, Ph.D. (Ind. U.), *Associate Professor of Biology.*
Roy B. Clarkson, Ph.D. (WVU), *Professor of Biology; Herbarium Curator.*
Jesse F. Clovis, Ph.D. (Cornell U.), *Professor of Biology.*
William E. Collins, Ph.D. (U. Wisc.), *Professor of Biology; Dean, Arts and Sciences.*
Mark H. Conner, Ph.D. (U. Md.), *Adjunct Professor of Biology.*
Mullen O. Coover, M.S. (WVU), *Associate Professor of Biology; Undergraduate Adviser.*
Earl L. Core, Ph.D. (Columbia U.), *Professor Emeritus of Biology.*
William V. Dashek, Ph.D. (Marquette U.), *Visiting Assistant Professor of Biology.*
Michael P. Donovan, B.A. (U. Cal.), *Visiting Assistant Professor of Biology.*
Dorothy Covalt Dunning, Ph.D. (Tufts U.), *Associate Professor of Biology.*
Ramsey H. Frist, Ph.D. (U. Pitt.), *Associate Professor of Biology.*
Lloyd R. Gribble, Ph.D. (WVU), *Professor Emeritus of Zoology.*
Roland L. Guthrie, Ph.D. (WVU), *Associate Professor of Biology; Arboretum Curator.*
John E. Hall, Ph.D. (Purdue U.), *Adjunct Professor of Biology.*
Willis H. Hertig, Jr., Ph.D. (WVU), *Associate Professor of Biology.*
H. William Hunt, Ph.D. (U. Tex.), *Associate Professor of Biology.*
Henry W. Hurlbutt, Jr., Ph.D. (U. Md.), *Professor of Biology.*
E. C. Keller, Jr., Ph.D. (Penn. St. U.), *Professor of Biology.*
Gerald E. Lang, Ph.D. (Rutgers U.), *Assistant Professor of Biology.*
Joseph A. Marshall, Ph.D. (U. Md.) *Associate Professor of Biology.*
Ethel C. Montiegel, M.S. (WVU), *Associate Professor of Biology.*
Dennis C. Quinlan, Ph.D. (U. Rochester), *Assistant Professor of Biology.*

Martin W. Schein, Sc.D. (J. Hopkins U.), *Centennial Professor of Biology.*
Walter R. Statkiewicz, M.S. (WVU), *Lecturer in Biology.*
Richard P. Sutter, Ph.D. (Tufts U.), *Professor of Biology.*
Leland H. Taylor, Sc.D. (Harvard U.), *Professor Emeritus of Zoology.*
Andrea M. Moffa White, Ph.D. (U. R.I.), *Assistant Professor of Biology.*
Leah A. Williams, Ph.D. (WVU), *Associate Professor of Biology.*

Programs

The Bachelor of Arts degree with a major in Biology is designed to prepare students for professional careers in the life sciences by way of several options. The required courses of the options provide preparation for graduate study in many of the specialized biological disciplines, for professional study in medicine, dentistry, or other health-related sciences, for secondary school teaching, or for technical careers in government and private industry. The options are: (1) General Biology — the standard program; (2) Environmental Science Technician; (3) Laboratory Science Technician; (4) Natural Science Technician; (5) Marine Science; and (6) Biobusiness.

Off-campus field experience in various aspects of marine biology is available in the summer at Wallops Island (Va.) Marine Station. Information regarding the program may be obtained by contacting the Chairman, Department of Biology.

Major in Biology

Admission to the degree program requires at least a cumulative average of 2.0 for courses in biology. Upon admission to the degree program (58 hours completed), the student may select any one of the program options. Some movement between options is possible, but the student must work closely with an adviser to insure completion of requirements in at least one option. The first two years of study are the same for all options; all, except the Natural Science option, satisfy requirements for admission to graduate and professional schools. (The Natural Science option lacks the 8 hours of Physics required by most graduate and professional schools.) Students must maintain at least a 2.0 cumulative average for biology courses taken at WVU in order to retain status as a biology major.

Minimum requirements for graduation with a degree in biology are 31 hours of biology courses. (*Note:* A maximum of 42 hours in biology may be counted towards meeting graduation requirements.) Biology electives must be selected from courses (other than Biol. 91) listed under Courses of Instruction in Biology; at least one of these electives must be a laboratory course. With the adviser's approval, courses in the College of Agriculture and Forestry and the School of Medicine may be selected to satisfy the elective requirement. The student should consult with the adviser in choosing biology electives and those general electives which satisfy both University and College of Arts and Sciences requirements.

Requirements for each of the program options are:

Courses Basic to All Options

Biol. 1, 2, 101, 102, 103, 104 — (24 hr.)

Chem. 15, 16, 133, 134, 135, 136 — (16 hr.)

Math. 14 *or* 3 and 4 (may be waived on the basis of ACT test scores) — (4 or 6 hr.)

Math. 15 and 16 *or* Math. 128 *and* either statistics or computer science: Econ. 125 may be substituted for Stat. 101 in the Biobusiness option. — (8 or 6 hr.)

In addition to the above, the following are specific requirements in each of the options.

General Biology (Standard) Option

Phys. 1, 2 — (8 hr.)
Biology electives — (7 or 8 hr.)

Environmental Science Technician Option

Phys. 1, 2 — (8 hr.)
Biol. 217 — (3 hr.)
Geology or Soils courses — (8 hr.)
Stat. 201 — (3 hr.)

Laboratory Science Technician Option

Phys. 1, 2 — (8 hr.)
Biol. 216 — (3 hr.)
Chem. 115, 141 and 142 — (8 hr.)
Ag. Bi. 210 — (3 hr.)

Marine Science Option

Phys. 1, 2 — (8 hr.)
Biol. 255 — (4 hr.)
Elective courses in Marine Sciences (usually taken during the summer at a marine biology station) — (9 hr.)

Natural Science Technician Option

Biol. 51, 151, 255 — (10 hr.)
Summer field experience or equivalent courses at a field station — (6 hr.)

Biobusiness Option

Phys. 1, 2 — (8 hr.)
Econ. 54, 55 — (6 hr.)
Biology electives — (7 or 8 hr.)
Business electives — (18 hr.)

Honors Program

Freshmen who have been admitted to the Honors Program of the College of Arts and Sciences may enroll in the Honors section of Biol. 1 and 2.

To be eligible for admission to the Departmental Honors Program, a student must have a 3.4 overall average, and must have the approval of the departmental honors faculty. Qualified students should consult their adviser about admission to the program.

Individual original research, a senior thesis, and seminar are a required part of the program.

Courses of Instruction in Biology (Biol.)

1. *General Biology.* I, II, S. 4 hr. Introductory course in biology: genetic, ecological, behavioral, developmental, and contemporary aspects of biology.

2. *General Biology.* I, II, S. 4 hr. Introductory course in biology: cellular, physiological, regulatory, taxonomic aspects of biology.

51. *Dendrology (Angiosperms).* I. 2 hr. Classification, identification, and distribution of angiosperm trees and shrubs of North America. *(Primarily for forestry students.)*

52. *Dendrology (Gymnosperms).* II. 1 hr. Classification, identification, and distribution of gymnosperm trees and shrubs of North America. *(Primarily for forestry students.)*

91. *Man and His Environment.* I. 3 hr. An examination of some of the facets of the environment which most directly affect human welfare. Central focus on environmental deterioration and corrective public policies. An interdisciplinary, nonprerequisite course for all students in the University. *((Also listed as S. Sci. 91.)*

101. *Animals As Organisms.* I. 4 hr. PR: Biol. 1 and 2 or equiv. An integrated study of the organism — development, structure, function, and evolution. Dissection kit required.

102. *Plants As Organisms.* II. 4 hr. PR: Biol. 1 and 2 or equiv. Integrated study of the organism — development, structure, function, and evolution.

103. *Population Biology.* I. 4 hr. PR: Biol. 1 and 2, Math. 4, or consent. Biological populations and their environmental relationships.

104. *Cellular and Molecular Biology.* II. 4 hr. PR: Biol. 1 and 2, general physics, organic chemistry, or consent. A study of cell structure and function beginning at the molecular level of organization and proceeding through different levels of complexity.

107. *Honors Investigation and Thesis.* I, II, S. 1-4 hr. (May be repeated for credit; max. credit 12 hr.) PR: Second semester of junior year, recommendation of adviser; biology majors only. Supervised readings, investigation, and study.

109. *Topics and Problems in Biology.* I, II, S. 1-4 hr. PR: Çonsent. Topics and problems in contemporary biology. All topics and problems must be selected in consultation with the instructor.

151. *Plant Systematics.* II. 4 hr. Classification, ecology, and identifications of local vascular plants.

152. *The Plant Kingdom.* I, S. 4 hr. PR: Biol. 1 and 2 or equiv. Study of the evolution, structure, and development of plants beginning with simple plants and proceeding through various levels of complexity to the flowering plants. (Not open to students having credit for Biol. 351, 352.) *(Offered in odd years.)*

169. *Plant Physiology.* II. 3 hr. PR: Chem. 15 and 16, or equiv. Physiochemical processes of plants.

201. *History of Biology.* I. 3 hr. PR: Biol. 1 and 2 or equiv. History of development of biological knowledge, with philosophical and social backgrounds.

209. *Topics and Problems in Biology.* I, II, S. 1-4 hr. PR: Consent. Topics and problems in contemporary biology. All topics or problems must be selected in consultation with the instructor.

211. *Life Cycle of the Cell.* I. 4 hr. PR: Biol. 104. Advanced study of fundamental cellular activities and their underlying molecular processes.

215. *Cytology.* II. 4 hr. PR: Biol. 1 and 2 or equiv. Cells, their structure and function.

216. *Methods in Cell and Molecular Biology.* I. 3 hr. PR: Biol. 104 or consent. Introduction to the theory and application of basic analytical tools used in molecular biol-

ogy. Included are selected topics in: hydrodynamic methods, chromatography, electrophoresis, and general laboratory methods. *(Offered in Fall of even years.)*

217. *Methods in Ecology and Biogeochemistry.* II. (Alternate Years.) 3 hr. PR: Biol. 103 and consent. Introduction to the theory and application of basic analytical tools used in ecology and biogeochemistry. Topics include sampling of terrestrial and aquatic organisms and their environment and chemical analyses of biological materials.

231. *Behavior of Organisms.* I. 4 hr. PR: Biol. 1 and 2 or Psych. 1, or equiv. Principles of individual and group behavior.

232. *Physiological Psychology.* I. 3 hr. PR: 9 hr. psychology, behavior, physiology, or graduate standing. Introduction to physiological mechanisms and the neutral basis of behavior. *(Also listed as Psych. 232.)*

235. *Primate Behavior.* II. 3 hr. PR: Consent. Primates as they exist in their natural habitats, as they suggest clues to human behavior and the evolution of behavior. Case studies and comparative primate behavior of prosimians to monkeys, to apes, to human hunters and gatherers. *(Also listed as Soc. & A. 257.)*

243. *Plant Ecology.* I. 4 hr. PR: Biol. 1 and 2 or equiv. Environmental and ecological relationships of plants.

246. *Limnology.* I. 4 hr. PR: Biol. 103 or consent. Physical, chemical, and biological characteristics of inland waters with an introduction to the principles of biological productivity.

251. *Principles of Evolution.* I, S. 3 hr. PR: Biol. 1 and 2 or equiv. Introduction to the study of evolution.

252. *Flora of West Virginia.* II, S. 3 hr. PR: Biol. 1 and 2 or equiv. Consideration of native plant life of the state.

253. *Plant Anatomy.* I. 4 hr. PR: Biol. 1 and 2 or equiv. Anatomy of seed plants. *(Offered only in Fall of odd years.)*

254. *Plant Geography.* II. 3 hr. PR: Biol. 1 and 2 or equiv. Study of plant groupings and worldwide distribution of plants.

255. *Invertebrate Zoology.* II. 4 hr. PR: Biol. 1 and 2 or equiv. Advanced study of animals without backbones.

256. *Ornithology.* II. 3 hr. PR: Biol. 1 and 2 or equiv. Lecture and laboratory studies on ancestry, evolution, topography, anatomy and physiology, systematics, behavior, migration, and ectoparasites of birds. Field studies will be limited in scope. *(Course will not be offered in 1979-80).*

257. *Ichthyology.* I. 3 hr. PR: Biol. 101 or consent. Internal and external structure of fishes, their systematic and ecological relationships, and their distribution in time and space. *(Dissection kit required.)*

258. *Mammalogy.* II. 3 hr. PR: Biol. 103 or W. Man. 224 and consent. Mammals and their biological properties with emphasis on life history, ecology, and distribution of regional forms. *(Course will not be offered in 1979-80.)*

259. *General Parasitology.* I. 4 hr. PR: Biol. 1 and 2 or equiv. Introduction to the biology of parasites. *(Dissection kit required.) (Course will not be offered in 1979-80.)*

260. *Plant Development.* I. 4 hr. PR: Biol. 102, organic chemistry or biochemistry, or consent. Experimental studies of plant growth and development.

261. *Comparative Anatomy.* I. 5 hr. PR: Biol. 101 or equiv. A comparative study of the morphology of selected vertebrates emphasizing functional and evolutionary relationships. *(Dissection kit required.)*

262. *Vertebrate Embryology.* II. 5 hr. PR: Biol. 1 and 2, 101 or equiv. Experimental and descriptive approach to the study of the development of vertebrates.

263. *Vertebrate Microanatomy.* II. 5 hr. PR: Biol. 101 or 261 and consent. Structural and functional approach to the study of tissues and organs of vertebrates.

265. *Comparative Neuroanatomy.* II. 4 hr. PR: Biol. 101 or 261 and consent. Comparative study of development and anatomy of the nervous systems of the vertebrates. *(Dissection kit required.) (Offered only in odd years.)*

266. *Human Physiology.* I, II. 4 hr. PR: Biol. 1 and 2 or consent. Introductory course in the function of man.

268. *Physiology of the Endocrines.* I, S. 3 hr. PR: Biol. 101 or 266, or equiv. organic chemistry or consent. Regulation of the organs of internal secretions and mechanisms of action of the hormones produced.

269. *Physiology of the Endocrines — Laboratory.* I. 1 hr. PR or Conc.: Biol. 268. Experimental techniques used in study of the endocrine system. *(Course will not be offered in 1979-80.)*

309. *Topics and Problems in Biology.* I, II, S. 1-4 hr. PR: Consent. Topics and problems in contemporary biology, to be selected in consultation with instructor.

311. *Biology Seminar.* I, II. 1 hr. Discussions and presentations of general interest to biologists.

315. *Molecular Basis of Virology.* I. 3 hr. PR: Biol. 104 or consent. Lectures on bacterial, animal and plant viruses; their structure, replication, and interaction with host cells. Discussion of the contributions virology has made to the understanding of molecular mechanisms in biology.

331. *Principles of Animal Behavior.* II. 4 hr. PR: Biol. 231 or equiv. Concepts in ethology and the principles governing interactions between animals. A comparative approach to animal behavior.

332. *Physiological Mechanisms of Animal Behavior.* II. 3 hr. PR: Biol. 231, 232, 331, or equiv. Explores the way behavior is controlled in a wide variety of animals so that commonalities and varieties of neutral and endocrine mechanisms may be better understood. *(Also listed as Psych. 332.)*

333. *Behavioral Ecology.* II. 4 hr. PR: Biol. 103 and 231 or consent. Discussion of the influences of external environmental factors on the regulation and control of behavior.

340. *Ecosystem Dynamics.* I. 3 hr. PR: Biol. 103 or equiv. Studies of modern approaches to ecosystem analysis. Emphasis will be on energy and material transfers. Approach will be holistic.

345. *Fisheries Science.* II. 4 hr. PR: Biol. 257 or consent. Population dynamics in relation to principles and techniques of fish management. *(Offered only in Spring of odd years.)*

346. *Production Limnology.* II. 3 hr. PR: Biol. 103 or 246 or equiv. Production in freshwater ecosystems. Emphasis will be on methodology and results of research. Both primary and secondary production dynamics will be discussed.

350. *Biosystematics.* I. 3 hr. PR: Biol. 1 and 2 or equiv. Techniques, history, and principles of the systematics of plants and animals. *(Offered only in Fall of odd years.)*

351. *Plant Morphology (Algae and Fungi).* II. 4 hr. PR: Biol. 1 and 2 or equiv. Development and structure of algae and fungi. *(Offered only in Spring of even years.)*

352. *Plant Morphology (Bryophytes and Vascular Plants).* II. 4 hr. PR: Biol. 1 and 2 or equiv. Development and structure of the bryophytes and vascular plants. *(Offered only in Spring of odd years.)*

354. *Fresh-Water Algae.* I. 4 hr. PR: Biol. 1 and 2 or equiv. Taxonomy, cytology, and ecology of aquatic, aerial and land forms of fresh-water algae. *(Offered only in Fall of even years.)*

355. *Advanced Plant Systematics I.* II. 3 hr. PR: Biol. 151 or equiv. Taxonomy of pteridophytes, gymnosperms, and monocotyledons. *(Offered only in Spring of odd years.)*

356. *Advanced Plant Systematics II.* II. 3 hr. PR: Biol. 151 or equiv. Taxonomy of dicotyledons. *(Offered only in Spring of even years.)*

357. *Aquatic Seed Plants.* I. 3 hr. PR: Biol. 1 and 2 or equiv. Classification, ecology, and identification of aquatic vascular plants.

358. *Field Study of Invertebrates.* S. 3 hr. PR: Biol. 1 and 2 or equiv. Taxonomy and ecology of invertebrates.

359. *Field Study of Vertebrates.* S. 3 hr. PR: Biol. 1 and 2 or equiv. Taxonomy and ecology of vertebrates.

362. *Developmental Biology.* I. 3 hr. PR: Biol. 101, 102, 262 or equiv. and organic chemistry. The molecular and cellular basis of differentiation and morphogenesis. *(Offered only in Fall of even years.)*

364. *Advanced Plant Physiology.* I, II. 3 hr. PR: Biol. 169 or equiv., organic chemistry, general physics, and consent. Advanced studies of plant processes including recent advances in the field. *I. Second Semester, odd-numbered years — Water relations and mineral nutrition and translocation. II. First Semester, odd-numbered years — Plant growth and development. III. Second Semester, even-numbered years — Environmental physiology.*

365. *Environmental Physiology.* II. 4 hr. PR: Biol. 101 or consent. Physiological mechanisms by which organisms adapt to their environments, comparing adaptations of phyletically different organisms to similar environments and the adaptations of similar organisms to different environments.

Chemistry

Faculty

William R. Moore, Ph.D. (U. Minn.), *Chairman and Professor.*
William R. Cherry, Ph.D. (U. Wash.), *Assistant Professor.*
Nar S. Dalal, Ph.D. (U. Br. Col., Can.), *Assistant Professor.*
Gabor B. Fodor, Ph.D. (U. Szeged, Hungary), *Centennial Professor.*
John A. Gibson, Jr., Ph.D. (MIT), *Professor Emeritus.*
Robert B. Green, Ph.D. (Ohio U.), *Assistant Professor.*
John Gruninger, Ph.D. (U. Penn.), *Associate Professor.*
George A. Hall, Jr., Ph.D. (Ohio St. U.), *Professor of Chemistry and Forestry.*
James L. Hall, Ph.D. (U. Wisc.), *Professor Emeritus.*
James B. Hickman, Ph.D. (Penn St. U.), *Professor.*
George L. Humphrey, Ph.D. (Ore. St. U.), *Professor and Associate Chairman.*
C. Gordon McCarty, Ph.D. (U. Ill.), *Professor.*
B. Jack McCormick, Ph.D. (Okla. St. U.), *Professor.*
Denis W. H. MacDowell, Ph.D. (MIT), *Professor.*
Joseph T. Maloy, Ph.D. (U. Tex.), *Associate Professor.*
Chester W. Muth, Ph.D. (Ohio St. U.), *Professor.*
Robert S. Nakon, Ph.D. (Tex. A&M U.), *Assistant Professor.*
Armine D. Paul, Ph.D. (U. Cal.), *Professor.*
Jeffrey L. Petersen, Ph.D. (U. Wisc.), *Assistant Professor.*
Peter Popovich, Ph.D. (Wash. St. U.), *Professor.*
Kenneth C. Showalter, Ph.D. (U. Colo.), *Assistant Professor.*
Stephen E. Stein, Ph.D. (U. Wash.), *Assistant Professor.*
Gerald W. Stewart, Ph.D. (U. Idaho), *Adjunct Assistant Professor.*
John H. Strohl, Ph.D. (U. Wisc.), *Associate Professor.*
Anthony Winston, Ph.D. (Duke U.), *Professor.*

Major in Chemistry — B.S.

The Bachelor of Science degree in chemistry is designed for those students who desire to qualify for professional positions in industry and governmental services as well as those who plan to do graduate work in chemistry. Requirements for the Bachelor of Science degree are listed below. Electives must be chosen so as to meet the basic requirements of the College of Arts and Sciences and the Department of Chemistry. A total of 136 hours is required, subject to the general course exclusions for all degrees. A second language, French, Russian, or German, is recommended. Students wishing to pursue an honors program should include Chem. 194 in chemistry electives. However, only 6 hours of Chem. 192, 194 or 202, separately or combined, may be counted toward meeting chemistry elective requirements.

Admission to the program and continuance for the third and subsequent semesters requires at least a cumulative average of 2.0 for courses in chemistry taken in the Department of Chemistry at WVU.

Required Courses

Chem. 17 and 18, or Chem. 15, 16, and 115; Chem. 133, 134, 136, 201, 210, 222, 235, 246, 247, 248, 249, 250, plus 9 hours of Chemistry electives approved by the department; Math. 15, 16, 17; Phys. 11, 12; Ger. 121, 122; Com. S. 20 or 30.

Recommended Electives in Chemistry

Chem. 211, 237, 239, 241, 243, 244, 314, 331, 332, 341.

Other Recommended Electives

Ag. Bi. 210 or 310; Com. S. 21, 31, and 120; E.E. 201 and 272; Geol. 294; Math. 18, 51, 113, 214; Phys. 124, 125, 126; Stat. 231.

Major in Chemistry — B.A.

The course requirements for the Bachelor of Arts degree with a major in chemistry are designed to meet the needs of those students who desire to go into careers which require a good background in the basic principles of chemistry. Areas such as medicine, dentistry, or other health-related sciences, secondary school teaching, or chemical laboratory technical work, may be pursued by proper choice of electives. However, only 6 hours of Chem. 192, 194, or 202, separately or combined, may be counted toward meeting chemistry elective requirements.

Admission to the program and continuance for the third and subsequent semesters requires at least a cumulative average of 2.0 for courses in chemistry taken in the Department of Chemistry at WVU.

Required Courses

Chem. 15, 16, and 115, or Chem. 17 and 18; Chem. 133, 134, 135, 136, 141, 142 (concurrent with Chem. 141), plus 8 hours of Chemistry electives approved by the department; Phys. 1, 2; Math. 15, 16; Biol. 1, 2.

Recommended Electives in Chemistry

Chem. 201, 211, 235, 237, 239, 241, 243, 244, 331, 332.

Other Recommended Electives

Ag. Bi. 210 or 310; Com. S. 20, 21, 30, 31, 120; E.E. 201, 272; Geol. 294; Math. 17, 18; Stat. 101.

Honors Program

To be eligible for admission to the departmental Honors Program, a student must have a 3.5 average in chemistry courses taken at WVU and must have the endorsement of the chemistry faculty.

A student may apply for initial admission to the program at any time after the student's first semester and no later than three semesters before graduation.

Application will be made to the departmental adviser who will serve as temporary adviser to the student.

A student re-entering the program, after having been out of it for a period of time, may in some cases be allowed to re-enter as late as the student's last semester in residence.

Courses of Instruction in Chemistry (Chem.)

Note: A charge is made for excessive breakage in laboratory courses and for failure to return desk equipment when leaving laboratory courses.

Lower Division

10. *Introduction to Chemistry*. I. II. 2 hr. Designed to prepare students for further work in chemistry. Scientific terminology and concepts; chemical arithmetic; chemical symbols, formulae and equations; mole concepts; problem solving. May not count for credit toward graduation if taken after credit for another course in chemistry has been established. 1 hr. lect., 1 hr. rec.

11. *Survey of Chemistry*. I. 4 hr. PR: Departmental examination or Chem. 10. Designed primarily for students taking only one year of college chemistry. Atomic structure; chemical bonding; acids, bases, and salts; periodicity; properties of gases, liquids, and solids; stoichiometry; oxidation-reduction. 2 hr. lect., 1 hr. rec., 3 hr. lab. *(Students may not receive credit for Chem. 15 or 17 and for Chem. 11.)*

12. *Survey of Chemistry*. II. 4 hr. PR: Chem. 11. Continuation of Chem. 11. Nuclear chemistry; air and water pollution; useful natural materials; consumer chemistry; introduction to organic and biochemistry. 2 hr. lect., 1 hr. rec., 3 hr. lab. *(Students may not receive credit for Chem. 16 or 18 and for Chem. 12.)*

15. *Fundamentals of Chemistry*. I. II. 4 hr. PR: Departmental examination or Chem. 10. For students who need more than one year of college chemistry and for students in engineering. Develops terminology, conceptual foundations, and quantitative relationships on which subsequent courses in chemistry will be built. 2 hr. lect., 1 hr. rec., 3 hr. lab. *(Students may not receive credit for Chem. 17 and for Chem. 15.)*

16. *Fundamentals of Chemistry*. I. II. 4 hr. PR: Chem. 15. Continuation of Chem. 15. 2 hr. lect., 1 hr. rec., 3 hr. lab. *(Students may not receive credit for Chem. 18 and for Chem. 12 or 16.)*

17. *Principles of Chemistry*. I. 5 hr. PR: High school chemistry and Department of Chemistry examination. A more advanced treatment of the principles and theories of chemistry than offered in Chem. 15 and 16. Primarily for students specializing in chemistry. 3 hr. lect., 1 hr. rec., 3 hr. lab. *(Students may not receive credit for Chem. 17 and for Chem. 11, 15, or 115.)*

18. *Principles of Chemistry*. II. 5 hr. PR: Chem. 17. Continuation of Chem. 17. 2 hr. lect., 1 hr. rec., two 3 hr. lab. *(Students may not receive credit for Chem. 18 and for Chem. 12, 16, or 115.)*

Upper Division

115. *Introductory Analytical Chemistry.* I, II. 4 hr. PR: Chem. 16. Volumetric analysis, gravimetric analysis, solution equilibria, spectrophotometry, separations, and electro-chemical methods of analysis. 2 hr. lect., two 3 hr. lab. *(Students may not receive credit for Chem. 115 and for Chem. 17 and 18.)*

131. *Organic Chemistry: Brief Course.* II. 4 hr. PR: Chem. 16. Emphasis on biological applications for students in medical technology, agriculture, and family resources. Nomenclature, structure, reactivity, and stereochemistry are stressed. 3 hr. lect., 3 hr. lab. *(Students may not receive credit for Chem. 131 and for Chem. 133 and 134.)*

133. *Organic Chemistry.* I, II. 3 hr. PR: Chem. 16 or 18 and 135 or concurrent enrollment. Basic principles of organic chemistry. Modern structural concepts, the effect of structure on physical and chemical properties, reactions and their mechanisms and application to syntheses. 3 hr. lect. *(Students may not receive credit for Chem. 133, 134, and for Chem. 131.)*

134. *Organic Chemistry.* I, II. 3 hr. PR: Chem. 133, 135, and 136 or concurrent enrollment. Continuation of Chem. 133. 3 hr. lect.

135. *Organic Chemistry Laboratory.* I, II. 1 hr. PR or Conc: Chem. 133. Fundamental organic reactions and the preparation of organic compounds. 3 hr. lab.

136. *Organic Chemistry Laboratory.* I, II. 1 hr. PR: Chem. 133, 135 and 134, or concurrent enrollment. Continuation of Chem. 135. 3 hr. lab.

141. *Physical Chemistry: Brief Course.* I, II, S. 3 hr. PR: Chem. 16, Math. 15. Beginning physical chemistry covering the subjects of chemical thermodynamics, chemical dynamics, and the structure of matter. 3 hr. lect. *(Students may not receive credit for Chem. 246 and 248 and for Chem. 141.)*

142. *Experimental Physical Chemistry.* I, II, S. 1 hr. PR or Conc: Chem. 141 or 246. Laboratory work in physical chemistry designed to accompany Chem. 141. One 3-hr. lab.

192. *Undergraduate Research.* I, II. 1-3 hr. PR: Written consent and a 3.0 grade-point average in chemistry courses. Individual investigations under supervision of an instructor. 3-9 hr. lab.

194. *Honors Course.* I, II. 1-3 hr. PR: Written consent and at least a 3.5 average in chemistry courses taken in the department. Research for students in the departmental honors program. Thesis required.

201. *Chemical Literature.* II. 2 hr. PR: Chem. 131 or 134. Study of techniques of locating, utilizing, and presenting information needed by research workers in chemistry. 2 hr. lect.

202. *Selected Topics.* I, II. 1-3 hr. PR: Written consent, with at least a 2.0 grade-point average in chemistry courses. Individual instruction under supervision of an instructor.

210. *Instrumental Analysis.* II. 3 hr. PR: Chem. 115 and physical chemistry. Basic instrumentation of analytical measurements. Electronics and instrument design. Methods of electrochemical and spectrochemical analysis. 2 hr. lect., 3 hr. lab.

211. *Intermediate Analytical Chemistry.* I. 3 hr. PR: Chem. 115 and physical chemistry. Principles of analytical procedures and separations at an advanced level. 3 hr. lect.

222. *Chemistry of Inorganic Compounds.* II. 3 hr. PR: Physical chemistry. Correlation of reactions and properties of elements and compounds based on modern theories of chemical bonding and structure. Acid-base theory, non-aqueous solvents, ligand field theory, and stereochemistry. 3 hr. lect.

235. *Methods of Structure Determination.* I. 4 hr. PR: Chem. 134 and 136. Use of chemical methods and u.v., ir., n.m.r., e.s.r., Raman and mass spectroscopy to elucidate structures of organic compounds. For students in chemistry and related fields who may need these methods in research and applied science. 2 hr. lect., two 3-hr. lab.

237. *Polymer Chemistry.* I or II. 3 hr. PR: Chem. 134 and Physical chemistry. Methods, mechanisms, and underlying theory of polymerization. Structure and stereochemistry of polymers in relation to chemical, physical, and mechanical properties. 3 hr. lect.

239. *Organic Syntheses.* II. 2 hr. PR: Chem. 136. Modern synthetic methods of organic chemistry. Two 3-hr. lab.

241. *Crystallography.* I or II. 3 hr. PR or Conc.: Physical chemistry or consent. Applications of X-ray diffraction of crystals to study of crystal and molecular structure. Includes theories of diffraction and crystallographic methods of analysis. 3 hr. lect.

243. *Introduction to Radiochemistry and Radiation Chemistry.* I. 3 hr. PR or Conc.: Physical chemistry. Fundamentals of radiochemistry and the use of tracer techniques. An introduction to radiation chemistry and how ionizing radiation interacts with matter. 2 hr. lect., 3 hr. lab. *(Course will not be offered in 1979-80.)*

244. *Colloid and Surface Chemistry.* II. 3 hr. PR: Physical chemistry. Selected topics in the properties and physical chemistry of systems involving macromolecules, lyophobic colloids, and surfaces. 3 hr. lect.

246. *Physical Chemistry.* I. 3 hr. PR: Chem. 134, Math. 16, and Physics 12. A first course in physical chemistry. Topics include a study of thermodynamics and chemical equilibria. 3 hr. lect. *(Students may not receive credit for Chem. 246 and for Chem. 141.)*

247. *Physical Chemistry Laboratory.* I. 1 hr. PR or Conc.: Chem. 246. Experimentation illustrating the principles of physical chemistry and offering experience with chemical instrumentation. One 3-hr. lab.

248. *Physical Chemistry.* II. 3 hr. PR: Chem. 246 and Math. 17. Continuation of Chem. 246. Chemical dynamics and the structure of matter. 3 hr. lect. *(Students may not receive credit for Chem. 248 and for Chem. 141.)*

249. *Physical Chemistry Laboratory.* II. 2 hr. PR: Chem. 246, 247, 248, or concurrent enrollment. Continuation of Chem. 247. Two 3-hr. lab.

250. *Chemical Bonding and Molecular Structure.* I. 3 hr. PR: Chem. 248. Introduction to the quantum theory of chemical bonding. Atomic structure, theoretical spectroscopy, predictions of molecular structures and bond properties. 3 hr. lect.

315. *Chemical Separations.* II. (Alternate Years.) 3 hr. PR: Chem. 115, 133, and Physical chemistry. Modern methods of chromatography from a theoretical and practical standpoint. General principles of separation stressing the practical implementation of these principles with particular emphasis on high performance liquid chromatography and gas chromatography. 3 hr. lect.

331. *Advanced Organic Chemistry I.* I. 3 hr. PR: Chem. 134. Structural concepts, bonding, tautomerism, static and dynamic stereochemistry, mechanistic classifications of reagents, and reactions including some applications. 3 hr. lect.

332. *Advanced Organic Chemistry II.* II. 3 hr. PR: Chem. 331. Continuation of Chem. 331 with emphasis upon synthetic methods and reaction mechanisms. 3 hr. lect.

341. *Chemical Thermodynamics.* I or II. 3 hr. PR: Chem. 248. Principles of classical and statistical thermodynamics and their application to chemical problems. 3 hr. lect.

Economics

Faculty

Neil A. Palomba, Ph.D. (U. Minn.), *Chairman and Professor.*
Vance Q. Alvis, Ph.D. (U. Va.), *Professor.*
Lewis C. Bell, Ph.D. (U. Ky.), *Professor.*
Robert D. Britt, Ph.D. (U. Colo.), *Professor.*
Thomas C. Campbell, Jr., Ph.D. (U. Pitt.), *Professor.*

Edward K. Dix, Ph.D. (U. Md.), *Assistant Professor.*
Randyl D. Elkin, Ph.D. (Iowa St. U.), *Associate Professor.*
Betty G. Fishman, M.S. (NYU), *Associate Professor.*
Michael S. Fogarty, Ph.D. (U. Pitt.), *Associate Professor.*
Clifford B. Hawley, Ph.D. (Duke U.), *Assistant Professor.*
Ming-jeng Hwang, Ph.D. (Tex. A&M U.), *Associate Professor.*
Parviz Jenab, Ph.D. (Ind. U.), *Instructor.*
Kern O. Kymn, Ph.D. (U. Chicago), *Professor.*
Dennis R. Leyden, Ph.D. (U. Va.), *Associate Professor.*
Patrick C. Mann, Ph.D. (Ind. U.), *Professor.*
Walter P. Page, Ph.D. (U. Kan.), *Associate Professor.*
Catherine A. Palomba, Ph.D. (Iowa St. U.), *Associate Professor.*
Suzanne E. Reid, Ph.D. (Duke U.), *Associate Professor.*
James H. Thompson, Ph.D. (U. Pitt.), *Professor.*
Royce J. Watts, M.S. (WVU), *Assistant Professor.*
Tom S. Witt, Ph.D. (Wash. U.), *Associate Professor.*
Gregory J. L. Yi, Ph.D. (U. Buffalo), *Professor.*

Programs

The College of Business and Economics offers all courses in economics, but these are recognized as a regular part of the program of the College of Arts and Sciences. The College of Business and Economics grants the degree of Bachelor of Science in Economics (B.S.), while the College of Arts and Sciences grants the B.A. degree with a major in Economics.

The program leading to the B.A. degree is designed for students who wish to combine fundamental training in economics with a liberal arts education. The Core Curriculum requirements must be met in the choice of electives. Of the total 128 hours required for graduation, some 40 or more credit hours are available for elective subjects.

Major in Economics

Required Courses

Econ. 54, 55, 125, 211, 212, 216. Student must take at least two non-Economics courses in Core B. Student must take at least two of the following five courses: Math. 3, 28, 15, 16, and 128 (to be credited toward the minimum of 12 hours required in Core C).

Also three courses from one of the areas of concentration listed below (9 hours — major concentration) and one course from each of two areas other than one chosen for major concentration (6 hours).

In addition, student must complete 9 upper-division hours in a minor field approved by the student's adviser. (The Department of Economics has negotiated a series of minors with various units. These include the School of Journalism and the departments of Biology, Foreign Languages, Geography, Philosophy, Political Science, Psychology, and Statistics and Computer Science. Information concerning these minors is available in Room 222, Armstrong Hall.)

Areas of Concentration

1. Quantitative Analysis[1]
   Econ. 220, 220,[2] 225
2. Public Sector and Private Enterprise
   Econ. 130, 200,[2] 241, 245, 246

3. Human Resources
   Econ. 160, 200,[2] 260, 262, 263, 265
4. Regional, International, and Development
   Econ. 110, 200,[2] 213, 250, 255, 257, 270

A minimum of 27 upper-division hours in Economics is required of majors.

[1] Students wishing to concentrate in quantitative analysis may supplement the area with courses approved by their advisers in mathematics and/or statistics. Students must still take a minimum of 27 upper-division hours in economics.

[2] In order for Econ. 200 (Special Topics) courses to satisfy concentration and distribution requirements, the courses must be selected from the relevant areas of concentration.

Recommended Courses

Any student planning to pursue graduate work in economics should take at least one semester of calculus. Math. 128 (Introduction to Calculus) is recommended.

Courses of Instruction in Economics (Econ.)

Lower Division

51. *The Economic System.* I, II. 3 hr. Introduction to the analysis of the economic system. Pricing system, monetary system, determination of national income and employment.

52. *Contemporary Economic Issues.* I, II. 3 hr. PR: Econ. 51. Current problems relating to the business system, government and the economy, natural and human resources.

54. *Principles of Economics.* I, II. 3 hr. Elementary microeconomic analysis. Not open, without permission, to students who have taken Econ. 51 and 52.

55 *Principles of Economics.* I, II. 3 hr. PR: Econ. 54. Elementary macroeconomic analysis. Not open, without permission, to students who have taken Econ. 51 and 52.

Upper Division

110. *Comparative Economic Systems.* I or II. 3 hr. PR: Econ. 52 or 55. Structure and processes of existing economic systems throughout the world including review of basic principles of free enterprise, socialistic, communistic, and fascistic societies. Comprehensive analysis based on current and recent experiments in these economies.

125 *Elementary Business and Economic Statistics.* I, II, S. 3 hr. PR: Grade of C or better in either Math. 3 or Math. 14 or consent. Basic concepts of statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression and correlation with emphasis on business and economic examples. *(Equiv. to Stat. 101.)*

130. *Money and Banking.* I, II. 3 hr. PR: Econ. 52 or 55. Our system of monetary and banking arrangements viewed in relation to functioning of the economic system as a whole.

160 *Labor Economics.* I, II. 3 hr. PR: Econ. 52 or 55. Introduction to labor economics and labor policies, personnel practices, and labor law.

200. *Special Topics.* I, II, S. 1-4 hr. PR: Econ. 52, 55 or consent. Special topics relevant to economics. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degrees.

205. *Current Economic Problems.* S. 3 hr. PR: Econ. 52, 55, or consent. For students in education only. Acquaints public school teachers with reliable source material in economics in studying current economic problems.

211. *Micro Economic Analysis.* I. 3 hr. PR: Econ. 52 or 55. Price and output determination and resource allocation in the firm under various competitive conditions.

212. *Macro Economic Analysis.* II. 3 hr. PR: Econ. 52 or 55. Analysis of forces which determine the level of income, employment, and output. Particular attention to consumer behavior, investment determination, and government fiscal policy.

213. *Economic Development.* I or II. 3 hr. PR: Econ. 52 or 55. Comprehensive study of the problems, changes, and principal policy issues faced by non-industrialized countries in the process of economic development.

216. *History of Economic Thought.* I or II. 3 hr. PR: Econ. 52 or 55. Economic ideas in perspective of historic development.

220. *Introduction to Mathematical Economics.* I or II. 3 hr. PR: Math. 15 or 128, and Econ. 52 or 55; or consent. Principal mathematical techniques including set operation, matrix algebra, differential and integral calculus employed in economic analysis. Particular attention given to static (or equilibrium) analysis, comparative-static analysis and optimization problems in economics.

225. *Applied Business and Economic Statistics.* I or II. 3 hr. PR: Econ. 125 or Stat. 101 or consent. A continuation of Econ. 125. Principal statistical methods used in applied business and economic research including multiple regression, index numbers, time series analysis, forecasting models and methods, and sampling design.

241. *Public Finance.* I, II. 3 hr. PR: Econ. 52 or 55. Governmental fiscal organizations and policy; taxes and tax systems with particular emphasis on the federal government and the state of West Virginia.

245. *Government and Business.* I or II. 3 hr. PR: Econ. 51 or 54. Market structure, conduct and performance: analysis of the antitrust laws — judicial interpretation and effect on the business sector.

246. *Transportation.* I, II. 3 hr. PR: Econ. 52 or 55. Development of an inland transportation system and relations and policies of transport agencies.

250. *International Economics.* I or II. 3 hr. PR: Econ. 52 or 55. Development of trade among nations; theories of trade; policies, physical factors, trends, and barriers in international economics.

255. *Regional Economics.* I or II. 3 hr. PR: Econ. 52 or 55. Analysis of the regional economy's spatial dimension, emphasizing interregional capital and labor mobility, the role of cities, objectives and issues of regional policy, lagging regions and Appalachia, growth poles, and regional growth and income distribution.

257. *Urban Economics.* II. 3 hr. PR: Econ. 52 or 55. Analysis of spatial dimensions of the urban economy, emphasizing both urban economic theory and urban policy. Issues include cities and income inequality, urban upgrading function, blight, economics of ghettos, the economies of urban size.

260. *Manpower Economics.* I or II. 3 hr. PR: Econ. 160 or consent. Economic and institutional forces determining the level and composition of labor supply and demand; labor mobility; governmental manpower policies.

262. *Collective Bargaining.* I or II. 3 hr. PR: Econ. 160 or consent. Theory and practice of collective bargaining; including contract issues, types of relationships, and the role of government policy.

263. *Economics of Wages.* I or II. 3 hr. PR: Econ. 160 or consent. Determination of wage levels and structure; economic and institutional forces determining wage levels and differentials.

265. *Economics of Social Security.* I or II. 3 hr. PR: Econ. 52, 55, or consent. Our social and political efforts to provide economic security, including an examination of the parallel developments of private insurance.

270. *Growth of the American Economy.* I or II. 3 hr. PR: Econ. 52 or 55. Central issues in the development of the American economy.

297. *Internship.* I, II, S. 1-12 hr. PR: Econ. 52 or 55 and Departmental approval. Field experience in the analysis and solution of economic problems in the public and private sectors.

299. *Readings in Economics.* I, II, S. 1-3 hr. PR: Econ. 52 or 55. Students will develop and carry out a program of specialized readings under the supervision of a cooperating instructor.

English Language and Literature

Faculty

Elaine K. Ginsberg, Ph.D. (U. Okla.), *Chairperson and Associate Professor.*
Rudolph Almasy, Ph.D. (U. Minn.), *Assistant Professor.*
Claire Badaracco, Ph.D. (Rutgers U.), *Visiting Assistant Professor.*
Joy U. Berkley, M.A. (WVU), *Assistant Professor.*
Sophia B. Blaydes, Ph.D. (Ind. U.), *Professor.*
Philip Bordinat, Ph.D. (U. Birmingham, Eng.), *Professor.*
J. P. Brawner, Ph.D. (U. Ill.), *Professor Emeritus.*
Arthur C. Buck, M.A. (U. Penn.), *Assistant Professor.*
Mary C. Buswell, M.A. (WVU), *Professor Emerita.*
Robert W. Clarke, Ph.D. (U. Wisc.), *Associate Professor.*
Mary Lou Clarkson, M.A. (WVU), *Assistant Professor.*
Patrick Conner, Ph.D. (U. Md.), *Assistant Professor.*
Lloyd M. Davis, M.A. (Vanderbilt U.), *Associate Professor.*
Oreta H. Dawson, M.A. (WVU), *Associate Professor.*
Edna M. Dillon, M.A. (WVU), *Assistant Professor.*
Richard B. Eaton, Jr., Ph.D. (U. N.C.), *Associate Professor.*
Nicholas G. Ehle, Jr., M.A. (WVU), *Assistant Professor.*
Nicholas G. Evans, M.A. (WVU), *Assistant Professor.*
David Farkas, Ph.D. (U. Minn.), *Assistant Professor.*
William P. Fitzpatrick, Ph.D. (U. Md.), *Associate Professor.*
John Flynn, M.A. (WVU), *Assistant Professor.*
Ruel E. Foster, Ph.D. (Vanderbilt U.), *Claude Worthington Benedum Professor of American Literature.*
William W. French, Ph.D. (U. Pitt.), *Associate Professor.*
Winston Fuller, M.A. (U. Colo.), *Assistant Professor.*
Jack W. Futrell, M.A. (Columbia U.), *Assistant Professor.*
Patrick W. Gainer, Ph.D. (St. Lou. U.), *Professor Emeritus.*
Anita Gandolfo, Ph.D. (CUNY), *Assistant Professor.*
Avery F. Gaskins, Ph.D. (Ind. U.), *Associate Professor.*
W. Michael Grant, Ph.D. (Brown U.), *Associate Professor.*
Carolyn H. Hampson, M.A. (WVU), *Assistant Professor.*
John L. Hicks, Jr., M.A. (Ind. U.), *Professor Emeritus.*
Martha C. Howard, M.A. (U. Mich.), *Associate Professor.*
Betty Jo Hypes, M.A. (WVU), *Assistant Professor.*
Iris M. Jennings, M.A. (WVU), *Assistant Professor.*
John H. Johnston, Ph.D. (U. Wisc.), *Professor.*
Terry Lucas, M.A. (WVU), *Assistant Professor.*
Russell C. MacDonald, Ph.D. (U. Penn.), *Associate Professor.*
Elizabeth Madison, Ph.D. (Ind. U.), *Assistant Professor.*
Thomas Miles, Ph.D. (SUNY), *Associate Professor.*
Jean Moss, Ph.D. (WVU), *Assistant Professor.*
Marilyn K. Nellis, Ph.D. (Ind. U.), *Visiting Assistant Professor.*
Byron C. Nelson, M.A. (U. Ill.), *Assistant Professor.*
Peter Neumeyer, Ph.D. (U. Cal.), *Professor.*
Virgil L. Peterson, Ph.D. (UCLA), *Professor.*

John Racin, Jr., Ph.D. (Ohio St. U.), *Professor.*
Margaret Racin, M.A. (WVU), *Instructor.*
Kathleen G. Rousseau, M.A. (WVU), *Assistant Professor.*
Frank Scafella, Jr., Ph.D. (U. Chicago), *Associate Professor.*
Dorothy Sedley, M.A. (Sonoma St. C.), *Assistant Professor.*
Aileen K. Shafer, M.A. (WVU), *Assistant Professor.*
Fred Manning Smith, Ph.D. (Cornell U.), *Professor Emeritus.*
Elizabeth C. Spindler, M.A. (WVU), *Assistant Professor.*
John F. Stasny, M.A. (Marquette U.), *Professor.*
Judith G. Stitzel, Ph.D. (U. Minn.), *Associate Professor.*
Barry Ward, Ph.D. (Ohio St. U.), *Assistant Professor.*
Hayden Ward, Ph.D. (Columbia U.), *Associate Professor.*
Jack Welch, M.F.A. (U. Iowa), *Associate Professor.*

Programs

An English major must complete a minimum of 33 hours in English literature, language, and composition, exclusive of Engl. 1 and 2.

A student may combine studies leading to a Bachelor of Arts degree in English with studies leading to certification for teaching English or Language Arts (comprehensive) in the secondary schools.

Advisers of upper-division students who are not English majors may schedule them for courses in the 100 and 200 series without regard to prerequisites. Students enrolling in 200 courses, however, may have special difficulties if they have not had prior work in literature courses.

Major in English

Required Courses

Engl. 21, 22, 24, and 25. One course from the following: Engl. 111, 113, 210, 211. At least six additional courses offered by the Department of English in literature, language, or writing.

Electives

The 33 credit hours named above are minimal. The English major may have a maximum of 42 hours in English, exclusive of Engl. 1 and 2, within the 128 hours required for graduation.

The student can choose any one of four tracks as an English major: (1) a concentration in writing; (2) a concentration in literature, American or British; (3) a concentration in language and literature with certification for teaching in the public schools; (4) a concentration in language and literature as preparation for entrance into professional schools such as law, medicine, or dentistry.

Honors Program

At the beginning of the second semester of the junior year, an English major who has achieved an overall grade-point average of 3.0 or better, and whose record in English studies is 3.3 or better, may apply for admission to the Honors Program of the Department of English. Such students will enroll for at least 3 hours credit in Engl. 197 or 198 and will complete an honors project in literary or linguistic research or in creative writing to be presented at an honors colloquium.

Publications

The Department of English edits *Victorian Poetry*, the critical journal of Victorian literature established by WVU in 1963, which has become the internationally recognized scholarly journal in its field with subscribers in all 50 states and in 26 foreign countries.

Dialogue, a journal for all English teachers in West Virginia, is sponsored by the Department of English.

Reflections, a publication of WVU student creative writing, is also sponsored by the Department of English.

Archives of British History and Culture also is supported by the Department of English.

West Virginia Philological Papers, a publication dedicated to literary scholarship within the state, is co-sponsored by the Department of English.

Courses of Instruction in English Language and Literature (Engl.)

Lower Division

1. *Composition and Rhetoric.* I, II, S. 3 hr. Required of all candidates for bachelor's degree in all colleges except for certain students of superior achievement who may be exempted from the requirement under regulations prevailing at time of admission.

2. *Composition and Rhetoric.* I, II, S. 3 hr. PR: Engl. 1. Required of all candidates for bachelor's degree in all colleges unless the requirement for certain students of superior achievement is waived under regulations announced for year of admission.

8. *Intermediate Composition.* I, II. 3 hr. PR: Engl. 1 and 2. Composition for students who wish to develop skills in solving problems of written communication relevant to their career objectives.

21. *Survey: English Literature.* I, II. 3 hr. English authors from Beowulf to Burns and readings from their works.

22. *Survey: English Literature.* I, II. 3 hr. English authors from Robert Burns to the present and readings from their works.

24. *American Literature.* I, II. 3 hr. American authors to 1870 with readings from their works.

25. *American Literature.* I, II. 3 hr. Continuation of Engl. 24. American poetry and prose from 1870 to the present.

35. *Types of Literature.* I, II. 3 hr. Selected works of poetry and drama read for appreciation and enjoyment.

36. *Types of Literature.* I, II. 3 hr. Selected works of prose fiction.

80. *Literature of Black America.* I, II. 3 hr. A survey course in black American literature from its inception to the present.

Upper Division

101. *Creative Writing: Narration (Short Story).* I, II. 3 hr. Purpose and pattern of the modern short story; study of examples in the current periodicals; special assignments and conferences with individual students on a minimum number of short stories.

102. *Creative Writing: Fiction.* I, II. 3 hr. Workshop course for students to explore further their interests in writing fiction. Emphasis on studying the craft and analyzing the students' own work.

103. *Creative Writing: Poetry.* I, II. 3 hr. Practice in basic techniques of writing poetry. Possibilities and limitations of the poetic genre. Primary emphasis on image, metaphor, and development by association.

104. *Creative Writing: Poetic Forms.* I, II. 3 hr. Practice in the basic techniques of writing open and closed forms of poetry. Primary emphasis on rhythm, sound, tone, and voice.

105. *Business English.* I, II, S. 3 hr. Assembling economic and commercial data, and writing business correspondence and reports; covers content, organization, style and conventions of grammar and usage.

108. *Advanced Composition.* I, II. 3 hr. PR: Engl. 1 and 2. Composition for advanced students who wish to further develop their expository writing skills.

111. *The English Language.* I, II. 3 hr. Structure of the English language. Linguistic study designed especially for English teachers in secondary schools. Required of all teacher trainees preparing for certification in English or Language Arts.

112. *Words and Usage.* I, II. 3 hr. Practical vocabulary building, English grammar and usage. Attention to the derivation, history, and meaning of words, and to the principles of syntax and grammar.

113. *American English.* I, II. 3 hr. Historical survey of the development of American English from the time of colonization to the present. Attention to social, cultural, economic, and political forces that have influenced the development of American English. Emphasis on the Appalachian dialect.

125. *World Literature.* I, II. 3 hr. Selected readings in the works of authors of world literature both ancient and modern.

130. *Biography and Autobiography.* I, II. 3 hr. Biography and autobiography as a genre; representative works chosen for their literary value and their interest and relevance in contemporary life; figures in the arts, sciences, business, and public life.

131. *American Fiction.* I, II. 3 hr. Reading of short stories and novels by American authors of the nineteenth and twentieth centuries.

132. *Poetry.* I, II. 3 hr. Appreciation and enjoyment of poems through critical and analytical reading. Studies in the various types of poetry, and of the language, imagery, and techniques of poetic expression.

133. *The Short Story.* I, II. 3 hr. The short story's structure, history, and contemporary forms.

140. *Introduction to Folklore.* I, II, S. 3 hr. General view of folklore, in both its theoretical and its functional aspects. Emphasis on recognition, collection, and documentation of collected materials.

141. *American Folklore and Culture.* I, II, S. 3 hr. PR: Engl. 140 or consent. Various aspects of folklore from the American Indian, early settlers, the American Negro, the immigrant, and occupational groups. Influence of folklore on American culture.

143. *Modern Continental Novel.* I, II. 3 hr. Discussion and analysis of continental novels of the twentieth century.

150. *Shakespeare.* I, II. 3 hr. Twelve of Shakespeare's most important plays.

170. *Modern Literature.* I. 3 hr. British and American poetry, drama, and fiction of the period from 1900 to 1930.

171. *Modern Literature.* II. 3 hr. Continuation of Engl. 170 from approximately 1930 to 1960.

172. *Contemporary Literature.* I, II, S. 3 hr. An examination of the significant literature written since 1960 in England and America. Poetry, drama, and fiction. Selections will vary depending on the instructor.

175. *Science Fiction and Fantasy.* I, II, S. 3 hr. A study of the history and nature of science fiction from H. G. Wells to the present, with special attention to those features of prose narration that science fiction shares with fantasy.

180. *Literature of the Old Testament.* I, II. 3 hr. Various types of literature exemplified in the Old Testament, read for their intrinsic merit and for their historical and cultural significance. Continued in Engl. 181.

181. *Literature of the New Testament.* I, II. 3 hr. Contents of the Old Testament Apocrypha and New Testament, their literary quality, with consideration of historical relations and of relationships of the several writers represented.

183. *Study of Selected Authors.* I, II, S. 3 hr. Study of the works of one or more major authors. *(May be repeated with a change in course content.)*

185. *An Introduction to Contemporary African Literature.* I, II. 3 hr. Survey course including contemporary African poetry, drama, and fiction.

188. *Images of Women in Literature.* I, II. 3 hr. Representative literary works studied against backdrop of social and historical documents to examine effect of images of women in literature on self-image of women today.

190. *Teaching Practicum.* I, II, S. 1-3 hr. Teaching practice as a tutor or assistant in composition, literature, or business English.

191. *Special Topics.* I, II. 3 hr. PR: Departmental consent. With departmental consent, may be repeated for a maximum of 9 credit hours. *(Credit received for repeating Engl. 191 only when content of course is different.)* Topics in literature, language, or writing.

197. *Honors Course.* I, II. 3 hr. PR: Departmental consent. Independent reading and study. For students admitted to the Honors Program in the second semester of their junior year.

198. *Honors Course.* I, II. 3 hr. PR: Departmental consent. For the first semester of the senior year of students admitted to the Honors Program.

201. *Creating Writing Workshop: Fiction.* I, II. 3 hr. Advanced workshop in creative writing for students seriously engaged in writing fiction.

202. *Creative Writing Workshop: Poetry.* I, II. 3 hr. Advanced workshop in creative writing for students seriously engaged in the writing of a major group of poems.

208. *Scientific and Technical Writing.* I, II, S. 3 hr. PR: Engl. 1 and 2, or equiv. Writing for scientific and technical professions. Descriptions of equipment and processes; reports and proposals; scientific experiments; interoffice communications; articles for trade and research journals.

210. *Structure of the English Language.* I, II. 3 hr. Historical, comparative, and descriptive grammar, together with an introduction of English linguistics. *(Course will not be offered in 1979-80.)*

211. *History of the English Language.* I, II. 3 hr. The nature of the language; questions of origins, language families, development, relationships of English as one of the Indo-European languages.

220. *American Poetry.* I, II. 3 hr. Major American poets of the nineteenth and twentieth centuries.

223. *Modern American Poetics.* I, II. 3 hr. A close study of those poets who have shaped the aesthetics of contemporary American poetry. *(Course will not be offered in 1979-80.)*

225. *Appalachian Literature.* I, II. 3 hr. An approach to understanding life through the imaginative literature of the region. Poetry, fiction, drama, cinema, and personal essays will be discussed.

232. *Literary Criticism.* I, II. 3 hr. Literary criticism from Aristotle to modern times.

233. *Recent Literary Criticism.* I, II. 3 hr. Brief survey of theories of major schools of modern criticism and an application of these theories to selected literary works. *(Course will not be offered in 1979-80.)*

234. *Modern Drama.* I, II. 3 hr. World drama from Ibsen to the present day.

235. *American Drama.* I, II. 3 hr. Representative American dramas and history of theatre in America.

236. *Tragedy.* I, II. 3 hr. Masterpieces of tragedy from Greek times to modern, with consideration of changing concepts of tragedy and of ethical and ideological values reflected in works of major tragic authors.

240. *Folk Literature.* I, II. 3 hr. The folk ballad, its origin, history, and literary significance, based on Child's collection and on American ballad collections.

241. *Folk Literature of the Southern Appalachian Region.* I, II. 3 hr. Traditional literature of southern Appalachian region, including songs, prose, tales, languages, customs, based on material collected in the region — especially in West Virginia.

250. *Shakespearean Comedies and History Plays.* I, II. 3 hr. Representative comedies and histories of Shakespeare, with the background of classical and Renaissance theory and practice.

251. *Shakespearean Tragedy.* I, II. 3 hr.

255. *Chaucer.* I, II. 3 hr. Early poems, *Troilus and Criseyde,* and *The Canterbury Tales.* In addition to an understanding and appreciation of Chaucer's works, the student is expected to acquire an adequate knowledge of Chaucer's language.

256. *Milton.* I, II. 3 hr. All of Milton's poems and a few selected prose works. *(Course will not be offered in 1979-80.)*

261. *Sixteenth Century Prose and Poetry.* I, II. 3 hr. Studies from Caxton to Bacon, from Skelton to Shakespeare.

262. *Seventeenth Century Prose and Poetry.* I, II. 3 hr. Studies from Donne to Dryden.

263. *Literature of the Eighteenth Century.* I, II. 3 hr. Literature of the period 1660-1744 in relation to social, political, and religious movements of the time.

264. *Literature of the Eighteenth Century.* I, II. 3 hr. Continuation of Engl. 263, covering the latter half of the century. May be taken independently of Engl. 263.

265. *The Romantic Movement.* I, II. 3 hr. A survey of the works of the major British Romantic writers along with an introduction to works of scholarship in British Romanticism.

266. *American Romanticism.* I, II. 3 hr. Writings of Ralph Waldo Emerson, Henry David Thoreau, and Nathaniel Hawthorne. A study of relations of these men to history of their own time; their contributions to American thought and art.

267. *Victorian Poetry.* I, II. 3 hr. Major Victorian poets — Tennyson, Browning, Arnold, Rossetti, Morris, Swinburne, Fitzgerald — and a few of the later Victorian poets.

268. *Modern British Poetry.* I, II. 3 hr. British poetry from 1880 to present, including the Decadents, Counter-Decadents, Hopkins, Housman, Hardy, the Georgians, the Imagists, World War I poets, Yeats, Eliot, the Auden Group, and post-World War II poets. *(Course will not be offered in 1979-80.)*

280. *Southern Writers.* I, II. 3 hr. Twentieth-century Southern essayists, poets, short-story writers, and novelists in relation to ideological background.

283. *Study of Selected Authors.* I, II, S. 3 hr. Study of the works of one or more major authors. *(May be repeated with a change in course content.)*

286. *Black American Fiction.* I, II. 3 hr. Survey of novels and short stories written by black Americans from 1890 to the present.

288. *Women Writers in England and America.* I, II. 3 hr. Syllabus may vary from year to year to include women writers in a particular country, historical period, or genre; or writing on a particular theme.

290. *Independent Study.* I, II. 1-3 hr. PR: Departmental consent. May be repeated for a maximum of 9 credit hours. Individual study of literary, linguistic, and writing problems.

293. *Practicum in Teaching Composition.* I. 1 hr. PR: Engl. 108, 295. Designed to give prospective English and language arts teachers supervised practical experiences in individual writing tutorials.

294. *Fiction for Adolescents.* II. 3 hr. Designed for prospective teachers of English and language arts. Course focuses on recent fiction for adolescents as well as on traditional literature appropriate to the needs, interests and abilities of youth. Evaluative criteria emphasized.

295/391. *Approaches to Teaching Composition.* I. 3 hr. Surveys attitudes toward and techniques of teaching writing in elementary and secondary schools. Provides frequent opportunities for students to write, to analyze their writing, and to experiment in class with methods of teaching writing. *(May not be taken for both undergraduate and graduate credit).*

310. *Old English I.* I, II. 3 hr. Study of Anglo-Saxon with selected readings from the literature of the period.

311. *Old English II.* I, II. 3 hr. PR: Engl. 310. *Beowulf* and other texts in Old English.

330. *Early English Drama.* I, II. 3 hr. Study of the medieval and early Tudor drama to the age of Shakespeare.

331. *Elizabethan Drama.* I, II. 3 hr. Study of dramas of Shakespeare's contemporaries and successors to the closing of the theatres in 1642. Includes Kyd, Marlowe, Jonson, Heywood, Chapman, Webster, Beaumont, and Fletcher. *(Course will not be offered in 1979-80.)*

332. *Restoration and Eighteenth Century Drama.* I, II. 3 hr. Comedy, tragedy, the heroic play, the drama of sensibility and the reaction against it: Etherege, Wycherley, Farquhar, Congreve, Vanbrugh, Dryden, Otway, Goldsmith, and Sheridan.

334. *Contemporary Drama.* I, II. 3 hr. Recent developments in the drama, with special attention to Miller, Williams, Sartre, Anouilh, Osborne, Pinter, Bolt, and the Absurdists. *(Content altered as new playwrights representing new developments come into prominence.)*

335. *The English Novel to the Time of Scott.* I, II. 3 hr. Study of the English novel from the sixteenth century to the time of Scott, showing the development of the novelistic art from early narrative beginnings.

336. *The English Novel, 1832-1900.* I, II. 3 hr. Continuation of Engl. 335. Development of the English novel from the early nineteenth century to the beginning of the twentieth century. *(Course will not be offered in 1979-80.)*

337. *The Modern Novel.* I, II. 3 hr. Twentieth-century novel, with emphasis on works of selected British novelists.

340. *The American Novel to 1915, I.* I, II. 3 hr. History of American novel, based on reading of ten or twelve novels, from the beginning to World War I.

341. *The American Novel, II.* I, II. 3 hr. History of the American novel, based on readings of ten to twelve novels from World War I to the present.

350. *Shakespeare.* I, II. 3 hr. Intensive study of selected plays. Special attention to textual problems and to language and poetic imagery, together with the history of Shakespearean criticism and scholarship.

356. *Romantic Poetry.* I, II. 3 hr. Reading and study of the works of selected poets of the British Romantic movement with emphasis on related criticism and scholarship.

365. *Victorian Prose.* I, II. 3 hr. Study of the nonfictional writings of the great Victorian prose critics: Carlyle, Ruskin, Arnold, Newman, Macaulay, Huxley, and Morris.

366. *English Literature, 1880-1918.* I, II. 3 hr. Study of the more important writers and literary movements of the late Victorian and the Edwardian periods; emphasis on Hardy, Housman, Hopkins, Henley, Pater, Gissing, Moore, Butler, and writers of the "Aesthetic Movement." *(Course will not be offered in 1979-80.)*

369. *American Literature to 1830.* I, II. 3 hr. The major genres and themes of American literature in the colonial and early national periods (1620-1830) with special attention to the cultural context of the literature.

370. *American Literature, 1830-65.* I, II. 3 hr. The Romantic period in American literature, concentrating on Emerson, Thoreau, Poe, Hawthorne, and Melville.

371. *American Literature, 1865-1915.* I, II. 3 hr. The literature of transcendentalism, realism, and naturalism in America between the Civil War and World War I, concentrating on Whitman, Twain, James, Dickinson, Crane, Adams, and Dreiser. *(Course will not be offered in 1979-80.)*

372. *American Literature, 1915-Present.* I, II. 3 hr. American prose and poetry.

391/295. *Approaches to Teaching Composition.* I. 3 hr. Surveys attitudes toward and techniques of teaching writing in elementary and secondary schools. Provides frequent opportunities for students to write, to analyze their writing, and to experiment in class with methods of teaching writing. *(May not be taken for both undergraduate and graduate credit.)*

392. *Special Topics.* I, II, S. 1-9 hr. PR: Consent. Advanced study of special topics in language, literature, or writing.

Foreign Languages

Faculty

Robert J. Elkins, Ph.D. (U. Kans.), *Chairman of Foreign Languages; Professor of German.*
Michel J. Beauchemin, M.A. (Brown U.), *Assistant Professor of Romance Languages.*
Marilyn Bendena, Ph.D. (Wayne St. U.), *Assistant Professor of French.*
Laszlo Borsay, Ph.D. (U. Pitt.), *Associate Professor of Classical Languages.*
Axel Claesges, Ph.D. (Vanderbilt U.), *Associate Professor of German.*
Patricia Cummins, Ph.D. (U. N.C.), *Assistant Professor of Romance Languages.*
Eleanor R. Gibbard, M.A. (WVU), *Associate Professor of French; Foreign Language Examiner.*
Pablo Gonzalez, Ph.D. (U. Madrid), *Associate Professor of Spanish.*
Gary L. Harris, Ph.D. (Ohio St. U.), *Associate Professor of Russian.*
Luis Harss, M.A. (Stanford U.), *Assistant Professor of Spanish.*
Francisco Herrera, M.A. (WVU), *Professor Emeritus of Spanish.*
Donald T. Huffman, M.A. (Ind. U.), *Assistant Professor of German.*
Victor J. Lemke, Ph.D. (U. Wisc.), *Professor Emeritus of German.*
Arthur C. McBride, Docteur de l'universite de Bordeaux (U. Bordeaux), *Professor Emeritus of French.*
Warren F. Manning, Ph.D. (Harvard U.), *Professor Emeritus of Romance Languages.*
Joseph A. Murphy, Ph.D. (Ohio St. U.), *Associate Professor of French.*
Jean-Pierre M. Ponchie, Ph.D. (Mich. St. U.), *Associate Professor of French.*
Joseph J. Prentiss, Ph.D. (U. Pitt.), *Associate Professor of Classical Languages.*
Joseph F. Renahan, M.S. (Yeshiva U.), *Associate Professor of Romance Languages.*
Jürgen Schlunk, Ph.D. (U. Marburg), *Assistant Professor of German.*
William L. Siemens, (U. Kans.), *Associate Professor of Spanish.*
Armand E. Singer, Ph.D. (Duke U.), *Professor of Romance Languages.*
Rosslyn Smith, Ph.D. (U. N.M.), *Assistant Professor of Spanish and Linguistics.*
Janice Spleth, Ph.D. (Rice U.), *Assistant Professor of French.*
Robert Stilwell, Ph.D. (U. Tex.), *Professor Emeritus of German.*

Harley U. Taylor, Ph.D. (Ind. U.), *Professor of German; Associate Chairman.*
Stanley Whitley, Ph.D. (Cornell U.), *Assistant Professor of Spanish and Linguistics.*

Programs

The Department of Foreign Languages offers work in foreign languages, literatures, cultures, and in linguistics. Languages included are Chinese, French, German, Greek, Hebrew, Italian, Japanese, Latin, Polish, Portuguese, Russian, Spanish, and Swahili. Certain literature courses are taught in English and are known as FLIT (Foreign Literature in Translation) courses. Other areas are English for Foreign Students, Linguistics, Language Teaching Methods, and Bibliography and Research. A student may be a candidate for a B.A. degree, with options in French, German, Russian, Spanish, Classics, Linguistics, Foreign Literature in Translation, and English As a Foreign Language.

A foreign language major must complete a minimum of 27 hours of upper-division work in foreign languages. Three of the hours must be Linguistics 111. LTM 221 can not be counted toward the major. Twelve of the hours must be in one of the listed options.

Options:
a. Frch. 103, 104, 109, 110
b. Ger. 103, 104, 109, 110
c. Span. 103, 104, 109, 110
d. Russ. 103, 104, 109, 110
e. Class. 109, 110, plus any two upper-division Classics courses approved by adviser
f. Lingu. 202, 203, 283, 284
g. Four upper-division FLIT courses approved by adviser

All students majoring in foreign languages must present a minor consisting of 12 upper-division hours from within the department or from outside the department. The outside minor must be approved by the adviser. The departmental minor may not duplicate courses from the major. All 12 hours in the minor must have the same division prefix (i.e., German, Spanish, Linguistics, FLIT, etc.)

Students electing options a-f may not use FLIT courses to fulfill the major requirements.

Students wishing teaching certification will be advised at the time they enter the program as to which courses fulfill certification requirements.

Students also should elect relevant courses in history, political science, humanities, English, journalism, geography, sociology and anthropology, and/or business and economics. Students electing the joint Foreign Language/Economics program should make this information available to the Chairman of Foreign Languages at the earliest opportunity in order to enroll in the correct Economics courses.

The Department of Foreign Languages cooperates closely with several other departments in offering interdepartmental majors in Slavic Studies and Comparative Literature.

Note 1: The basic series of foreign language courses is divided into three levels: elementary, intermediate, and advanced. The elementary level, courses 1 and 2, provides beginning work in the four basic skills of the language: understanding, speaking, reading, and writing, with emphasis on audio-lingual procedures. The vocabulary employed is limited to words of high frequency. Intermediate level, courses 3 and 4, provides further training in the four basic skills, with greater emphasis on reading. The vocabulary is greatly extended, espe-

cially the passive or recognition vocabulary. In courses 103, 104, 109, and 110, the four basic skills are further developed. All classroom questions and discussions are in the foreign language. The work is based on reading assignments followed by classroom discussions, oral drills, and written exercises.

Note 2: In French, German, Spanish, and Russian alternate routes are offered at the intermediate level. Courses numbered 23 and 24 provide two semesters of work intended to develop a thorough reading knowledge. In them very little attention is given to pronunciation and none at all to other aspects of the oral skills.

Courses numbered 33 and 34 are taught in the target language. The major difference between them and those numbered 3 and 4 is in the choice of materials. Courses 3 and 4 use literary materials as a basis for discussion whereas courses 33 and 34 use cultural materials. Students who elect courses 33 and 34 may then continue in the normal 103-110 sequence.

Students can receive credit for only one of the courses 1 or 21; 2 or 22; 3, 23, or 33; 4, 24, or 34; in the same language.

Note 3: Chinese, Hebrew, Japanese, Polish, Portuguese, and Swahili are not taught in the normal classroom sense but rather by the self-instructional method. Students practice two hours weekly in groups of four with a native tutor. The remainder of time is spent working with cassettes. Only students who seriously wish to learn these languages are advised to enroll in them.

Special Summer Courses of Study Abroad

These courses are currently offered in Spanish, French, and German, and are listed in the WVU Summer Sessions brochure, but they usually begin early, before the end of May, and end around the first of July. Spanish courses are held in Colombia or in Madrid, Spain; French courses are conducted at Cannes in France; in Germany classes are held in St. Goarshausen. Students normally register for two courses at WVU, but all work is carried on overseas.

Courses of Instruction in Bibliography and Research (Bibgy.)

365. *Methods of Research.* I. 3 hr.

Courses of Instruction in Chinese (Chin.)

1. *Elementary Chinese.* I. 3 hr. Taught by self-instructional method.
2. *Elementary Chinese.* II. 3 hr. Taught by self-instructional method.
3. *Intermediate Chinese.* I. 3 hr. Taught by self-instructional method.
4. *Intermediate Chinese.* II. 3 hr. Taught by self-instructional method.

Courses of Instruction in Classics (Class.)

Lower Division

1. *Elementary Latin.* I. 3 hr.
2. *Elementary Latin.* II. 3 hr.
3. *Intermediate Latin.* I. 3 hr. PR: Class. 1 and 2, or two years of high school Latin.
4. *Cicero's Orations.* II. 3 hr. PR: Class. 3 or two years of high school Latin.

11. *Elementary Greek.* I. 3 hr.
12. *Elementary Greek.* II. 3 hr.
13. *Intermediate Greek.* I. 3 hr.

14. *Intermediate Greek.* II. 3 hr.

Upper Division

101. *Greek and Roman Civilization and Culture.* I. 3 hr.

102. *Greek and Roman Myths.* II. 3 hr.

109. *Selections from Roman Prose.* I. 3 hr. PR: Class. 3 and 4 or equiv.

110. *Selections from Roman Poetry.* II. 3 hr. PR: Class. 4 and 109, or equiv.

113. *Roman Biographers.* I. 3 hr. PR: Class. 3 and 4 or consent.

165. *Roman Public and Private Life.* II. 3 hr.

192. *Special Topics.* I, II. 3 hr. PR: Consent.

201. *Roman Novelists.* I. 3 hr. PR: Class. 109, 110, or equiv.

202. *Romance Comedy.* II. 3 hr. PR: Class. 109, 110, or equiv.

235. *Roman Epic.* I. 3 hr. PR: Class. 109, 110, or equiv. *(Course will not be offered in 1979-80.)*

292. *Pro-Seminar in Latin or Greek Literature.* 1-6 hr.* Special topics.

392. *Seminar in Latin or Greek Literature.* 1-6 hr.* Special topics.

Courses of Instruction in English As a Foreign Language (EFL)

51. *Conversational English for Foreign Students.* I. 3 hr. This course will emphasize colloquial and idiomatic English expression, concentrating on listening comprehension and communicative skills.

52. *Conversational English for Foreign Students.* II. 3 hr. Continuation of EFL 51.

Courses of Instruction in Foreign Literature in Translation (FLIT)

111. *Italian Literature in Translation I.* I. 3 hr. Selected Italian works from the twelfth century to the end of the eighteenth century. Readings and discussion in English.

112. *Italian Literature in Translation II.* II. 3 hr. Selected Italian works from the nineteenth and the twentieth centuries. Readings and discussion in English.

121. *Latin Literature in Translation I.* I. 3 hr. Survey of Latin literature in translation.

122. *Latin Literature in Translation II.* II. 3 hr. Survey of Latin literature in translation.

131. *Greek Literature in Translation I.* I. 3 hr. Survey of Greek literature in translation.

132. *Greek Literature in Translation II.* II. 3 hr. Survey of Greek literature in translation.

141. *Spanish Literature in Translation I.* I. 3 hr. Selected Spanish works from the twelfth century to the end of the eighteenth century. Readings and discussion in English.

142. *Spanish Literature in Translation II.* 3 hr. selected Spanish works from the nineteenth and the twentieth centuries. Readings and discussion in English.

151. *Spanish American Literature in Translation I.* I. 3 hr. Selected Spanish American works from the sixteenth century to the end of the nineteenth century. Readings and discussion in English.

152. *Spanish American Literature in Translation II.* II. 3 hr. Selected Spanish American works from the nineteenth and the twentieth centuries. Readings and discussion in English.

*Variable credit courses normally carry 3 hours of credit. Exceptions are made only in emergencies and must be approved by the Department Chairperson and the professor teaching the course.

155. *Modern Hebrew Literature in Translation.* II. 3 hr. A survey course examining the literature and sociocultural content out of which it grew. From the Yiddish folk background of the ghetto, to the *Haskalah*, to the development of Israeli literature until the present.

161. *French Literature in Translation I.* I. 3 hr. Selected French works from the Middle Ages to the end of the eighteenth century. Readings and discussion in English.

162. *French Literature in Translation II.* II. 3 hr. Selected French works from the beginning of the nineteenth century to the present. Readings and discussion in English.

171. *Brazilian Literature in Translation.* II, S. 3 hr. Survey of Brazilian literary masterworks in English translation concentrating heavily on prose forms (novel, novelette, short story, play) dating from the mid-nineteenth century. *(Course will not be offered in 1979-80.)*

181. *German Literature in Translation I.* I. 3 hr. Selected German works from 800 A.D. to the period of Naturalism. Readings and discussion in English.

182. *German Literature in Translation II.* II. 3 hr. Selected German works from the period of Naturalism to the present. Readings and discussion in English.

191. *Russian Literature in Translation I.* I. 3 hr. Major works of Russian authors from the beginning to 1880, including those of Pushkin, Lermontov, Gogol, Turgenev, Dostoyevesky, and Tolstoy. Russian majors will read selections in the original.

192. *Russian Literature in Translation II.* II. 3 hr. Continuation of FLIT 191. Major literature of Soviet Union from 1880 to the present. Russian majors will read selections in the original.

211. *Chinese Literature in Translation.* I. 3 hr. Survey of selected works of Chinese literature from ancient times through the eighteenth century.

221. *Japanese Literature in Translation.* II. 3 hr. Survey of selected works of Japanese literature from ancient period to the mid-nineteenth century and an introduction to a few works of the modern period.

292. *Pro-Seminar.* I, II, S. 1-6 hr.* PR: 6 hr. upper-division literature courses or consent. Special topics.

392. *Seminar.* I, II, S. 1-6 hr.* PR: 6 hr. upper-division literature courses or consent. Special topics.

Courses of Instruction in French (Frch.)

Lower Division

1. *Elementary French.* I, II. 3 hr.

2. *Elementary French.* I, II. 3 hr. Continuation of Frch. 1.

3. *Intermediate French.* I, II. 3 hr. PR: Frch. 1, 2, or equiv.

4. *Intermediate French.* I, II. 3 hr. PR: Frch. 3, or consent. Continuation of Frch. 3.

21. *Elementary French: Programmed Reading.* I. 3 hr. Beginning French with concentration on reading comprehension.

22. *Elementary French: Programmed Reading.* II. 3 hr. PR: Frch. 21 or equiv. Continuation of Frch. 21.

23. *Intermediate French: Programmed Reading.* I. 3 hr. PR: Frch. 21, 22, or equiv.

24. *Intermediate French; Programmed Reading.* II. 3 hr. PR: Frch. 23, or equiv. Continuation of Frch. 23.

33. *Intermediate French: Cultural Emphasis.* I. 3 hr. PR: Frch. 1 and 2, or equiv.

*Variable credit courses normally carry 3 hours of credit. Exceptions are made only in emergencies and must be approved by the Department Chairperson and the professor teaching the course.

34. *Intermediate French: Cultural Emphasis.* II. 3 hr. PR: Frch. 3, 33, or equiv. Continuation of Frch. 33.

57. *French Culture and Civilization: Gaul-World War II.* I. 3 hr. Instruction in English.

Upper Division

101. *Commercial French.* II. 3 hr. PR: Frch. 4 or consent. Practical speaking, writing, and reading experience in French designed for the person planning to work in any phase of international business. Topics include import-export, banking, real estate, management, sales, marketing, personnel, etc.

103. *Advanced French.* I. 3 hr. PR: Frch. 3, 4, consent.

104. *Advanced French.* II. 3 hr. PR: Frch. 103 or consent.

109. *Advanced French.* I. 3 hr. PR: Frch. 104 or consent.

110. *Advanced French.* II. 3 hr. PR: Frch. 109 or consent.

111. *French Literature from the Middle Ages to the Eighteenth Century.* I. 3 hr. PR: Two years of college French or equiv. or consent.

112. *La litterature francaise de Louis XV à de Gaulle.* II. 3 hr. PR: Two years of college French or equiv. or consent.

115. *The Classical School.* I. 3 hr. PR: 12 hr. of French or equiv.

118. *Literature of the Nineteenth Century.* I. 3 hr. PR: 12 hr. of French or equiv.

203. *Conversational French.* I. 3 hr. PR: Frch. 110 or consent. Intensive spoken French.

217. *French Civilization.* II. 3 hr. PR: 12 hr. of French.

221. *The Romantic Movement.* I. 3 hr. PR: Consent.

222. *French Realism.* II. 3 hr. PR: Consent.

229. *Literature of the Sixteenth Century.* I. 3 hr. PR: Consent. *(Course will not be offered in 1979-80.)*

231. *Phonetics and Pronunciation.* II. 3 hr. PR: 18 hr. of French or equiv.

292. *Pro-Seminar.* I, II, S. 1-6 hr.* Special topics.

305. *Fundamentals for Reading French.* I. 3 hr. PR: Graduate or upper-division standing.

306. *Reading French.* II. 3 hr. PR: 12 hr. of French or equiv. or Frch. 305.

326. *Literary Criticism.* II. 3 hr. PR: B.A. in French or consent.

337. *Moliere.* II. 3 hr. PR: B.A. in French or consent. *(Course will not be offered in 1979-80.)*

344. *Explication de Textes.* II. 3 hr. PR: 18 hr. of French or equiv.

371. *The Modern Novel to 1930.* I. 3 hr. PR: B.A. in French or consent.

372. *The Novel After 1930.* II. 3 hr. PR: B.A. in French or consent.

381. *Medieval French Literature.* II. 3 hr. PR: Lingu. 343. *(Course will not be offered in 1979-80.)*

392. *Seminar.* 1-6 hr.* Special topics.

Courses of Instruction in German (Ger.)

Lower Division

1. *Elementary German.* I, II. 3 hr.

*Variable credit courses normally carry 3 hours of credit. Exceptions are made only in emergencies and must be approved by the Department Chairperson and the professor teaching the course.

2. *Elementary German.* I, II. 3 hr.

3. *Intermediate German.* I, II. 3 hr. PR: Ger. 1 and 2, or equiv.

4. *Intermediate German.* I, II. 3 hr. PR: Ger. 3, or consent. Continuation of German 3.

23. *Intermediate German: Programmed Reading.* I. 3 hr. PR: Ger. 1 and 2, or equiv.

24. *Intermediate German: Programmed Reading.* II. 3 hr. PR: Ger. 3, 23, or equiv. Continuation of Ger. 23.

33. *Intermediate German: Cultural Emphasis.* I. 3 hr. PR: Ger. 1 and 2, or equiv.

34. *Intermediate German: Cultural Emphasis.* II. 3 hr. PR: Ger. 3, 33, or equiv. Continuation of Ger. 33.

Upper Division

103. *Advanced German.* I. 3 hr. PR: Ger. 3, 4, or consent.

104. *Advanced German.* II. 3 hr. PR: Ger. 103 or consent.

105. *The German Novelle.* I. 3 hr. PR: Ger. 3, 4, or consent. Representative stories of Keller, Meyer, Storm, and Stifter.

108. *Nineteenth Century Drama.* II. 3 hr. PR: Ger. 3, 4, or consent. Representative dramas of nineteenth century dramatists.

109. *Advanced German.* I. 3 hr. PR: Ger. 104 or consent. Continuation of the four basic skills.

110. *Advanced German.* II. 3 hr. PR: Ger. 109 or consent.

121. *Scientific German.* I. 3 hr. PR: Ger. 1, 2. Primarily for students in science courses.

122. *Scientific German.* II. 3 hr. Continuation of Ger. 121.

242. *Faust.* II. 3 hr. PR: German, or consent. Critical study of Goethe's *Faust. (Course will not be offered in 1979-80.)*

243. *Medieval German Literature.* I. 3 hr. PR: Ger. 4 or consent. *(Course will not be offered in 1979-80.)*

245. *Classicism and Romanticism.* I. 3 hr. PR: Ger. 4 or consent. Critical study of German literature from 1750 to 1830.

246. *The Liberal Age.* II. 3 hr. PR: Ger. 4 or consent. Critical study of German literature from 1830 to 1880, with emphasis upon poetic realism.

247. *The Age of Crisis.* I. 3 hr. PR: Ger. 4 or consent. Critical study of German literature from 1880 to present.

265. *German Civilization.* I. 3 hr. PR: 12 hr. of German or consent. A general comprehensive survey of the most important aspects of German culture, including a brief historical background, the development of the German language, geography, science, music, art, architecture, literature, and philosophy.

292. *Pro-Seminar.* 1-6 hr.* Special topics.

301. *Independent Reading.* I. 3 hr. Supervised reading for students who want to do intensive work in any field of interest.

302. *Independent Reading.* II. 3 hr. Continuation of Ger. 301.

305. *Fundamentals of Reading German.* I. 3 hr. PR: Graduate status or upper-division standing. Ger. 305-306 is intended for graduate students from other departments to teach them to read general and technical German.

*Variable credit courses normally carry 3 hours of credit. Exceptions are made only in emergencies and must be approved by the Department Chairperson and the professor teaching the course.

306. *Reading German.* II. 3 hr. PR: 12 hr. of German or equiv. or Ger. 305. Graduate students may meet a doctoral foreign language requirement by achieving a grade of B or better in this course.

361. *Lyric Poetry.* I. 3 hr. PR: 18 hr. of German, or consent.

375. *The Modern Novel.* I. 3 hr. PR: 18 hr. of German. Supervised reading of nineteenth century novels.

376. *The Modern Novel.* II. 3 hr. Continuation of Ger. 275, with emphasis on recent fiction.

392. *Seminar.* 1-6 hr.* Special topics.

Courses of Instruction in Hebrew (Hebrw.)

1. *Elementary Modern Hebrew.* I. 3 hr. Taught by self-instructional method.
2. *Elementary Modern Hebrew.* II. 3 hr. Taught by self-instructional method.
3. *Intermediate Hebrew.* I. 3 hr. Taught by self-instructional method.
4. *Intermediate Hebrew.* II. 3 hr. Taught by self-instructional method.

Courses of Instruction in Italian (Ital.)

1. *Elementary Italian.* I. 3 hr.
2. *Elementary Italian.* II. 3 hr. Continuation of Ital. 1.
3. *Intermediate Italian.* I. 3 hr. PR: Ital. 1, 2, or equiv.
4. *Intermediate Italian.* II. 3 hr. PR: Ital. 3 or consent. Continuation of Italian 3.

109. *Composition and Conversation.* I. 3 hr. PR: Ital. 4 or consent.

110. *Advanced Conversation.* II. 3 hr. PR: Ital. 4 or consent.

Courses of Instruction in Japanese (Japan.)

1. *Elementary Japanese.* I. 3 hr. Taught by self-instructional method.
2. *Elementary Japanese.* II. 3 hr. Taught by self-instructional method.
3. *Intermediate Japanese.* I. 3 hr. Taught by self-instructional method.
4. *Intermediate Japanese.* II. 3 hr. Taught by self-instructional method.

Courses of Instruction in Language Teaching Methods (LTM)

Upper Division

221. *The Teaching of Foreign Languages.* I. 3 hr. Required of all students who are prospective foreign language teachers on the secondary level.

292. *Pro-Seminar.* I, II, S. 1-6 hr.* Special topics.

392. *Seminar.* I, II, S. 1-6 hr.* Special topics.

Courses of Instruction in Linguistics (Lingu.)

Lower Division

1. *Introduction to Language.* I, II, S. 3 hr. General introduction to the nature and structure of language; topics include oral and sign languages, dialects, and origin and history of human communication, and language and mind.

*Variable credit courses normally carry 3 hours of credit. Exceptions are made only in emergencies and must be approved by the Department Chairperson and the professor teaching the course.

2. *Introduction to Language.* I, II, S. 3 hr. Introduction to the different languages of the world. Oral and written communication.

3. *Introduction to Language Comparison.* I. 3 hr. Comparison of German, Spanish, and French. No previous language experience required.

111. *Introduction to Structural Linguistics.* I, II. 3 hr. Required for foreign language majors.

Upper Division

202. *Phonology.* I. 3 hr. PR: Lingu. 1, 111 or consent. Description of sounds and sound systems in language. Articulatory phonetics. Structuralist and generative approaches to phonemics.

203. *Morphology and Syntax.* II. 3 hr. PR: Lingu. 111 or consent. Grammatical analysis with emphasis on morphological and immediate constituent analysis.

211. *History of the Spanish Language.* II. 3 hr. PR: Consent. Evolution of Castilian from Vulgar Latin to its modern standard form through a study of historical phonology, morphology, and syntax together with the external factors which influenced the development of the language.

217. *Structure of Spanish.* I. 3 hr. PR: Lingu. 111 or consent. Description of the phonological or grammatical systems of Spanish, with emphasis on contrastive analysis (Spanish English) and applied linguistics.

241. *History of the French Language.* II. 3 hr. PR: Consent. Evolution of French from Vulgar Latin into the Modern French standard through a study of historical phonology, morphology, and syntax together with the external factors which influenced the development of the language. *(Course will not be offered in 1979-80.)*

247. *Structure of Modern French.* I. 3 hr. PR: 18 hr. of French and Lingu. 111 or consent. Study of phonology, morphology, and syntax of modern French together with a contrastive analysis of French and English.

251. *History of the German Language.* I. 3 hr. PR: 18 hr. of German or consent. Historical development of standard German with emphasis on its relationships to the other German languages and dialects. *(Course will not be offered in 1979-80.)*

257. *Structure of German.* II. 3 hr. PR: 18 hr. of German and Lingu. 111 or consent. Phonological, morphological, and syntactical structure of contemporary German language.

261. *History of the Russian Language.* I. 3 hr. PR: 18 hr. of Russian and Lingu. 111 or consent. Development of Russian from Indo-European to the present.

267. *Structure of Russian.* II. 3 hr. PR: 18 hr. of Russian and Lingu. 111 or consent. Phonological, morphological, and syntactical structure of contemporary Russian.

283. *Transformational Grammar.* S. 3 hr. PR: Lingu. 111 and consent. Emphasis on generative syntax in English, German, Romance, and Slavic languages.

284. *History of Linguistics.* I. 3 hr. Development of linguistics from Greeks and Romans to contemporary researchers with concentration on major linguists and schools of the nineteenth and twentieth centuries.

287. *Psycholinguistics.* I. 3 hr. PR: Lingu. 111 or consent. Provides an insight into the many areas of psycholinguistic study, including language acquisition, sentence processing, animal communication, dichotic listening, aphasia, and semantics.

288. *Dialectology.* I. 3 hr. PR: Lingu. 1, 111 or consent. Introduction to the linguistic study of geographical and social variation in language.

292. *Pro-Seminar.* 1-6 hr.* Special topics.

313. *Old Spanish.* II. 3 hr. PR: Consent. *(Course will not be offered in 1979-80.)*

343. *Old French.* I. 3 hr. PR: Consent. Study of the oldest monuments of the French language including the Chanson de Roland and Aucassin et Nicolette in an effort to trace the evolution of Francien, Anglo-Norman, and Picard from Vulgar Latin. *(Course will not be offered in 1979-80.)*

353. *Middle High German I.* I. 3 hr. PR: 18 hr. of German and Lingu. 111 or consent. Study of the linguistic developments of Middle High German from the eleventh to the fifteenth centuries with illustrative reading from the Niebelungenlied.

354. *Middle High German II.* II. 3 hr. PR: Lingu. 353. Continuation of Lingu. 353 with illustrative readings from the Middle High German lyric poets and the courtly epics.

392. *Seminar.* 1-6 hr.* Special topics.

Courses of Instruction in Polish (Polsh.)

1. *Elementary Polish.* I. 3 hr.

2. *Elementary Polish.* II. 3 hr. PR: Polsh. 1. Continuation of Polsh. 1.

Courses of Instruction in Portuguese (Port.)

1. *Elementary Portuguese.* I. 3 hr.

2. *Elementary Portuguese.* II. 3 hr.

3. *Intermediate Portuguese.* I. 3 hr. PR: Port. 1, 2 or equiv. *(Course will not be offered in 1979-80.)*

4. *Intermediate Portuguese.* II. 3 hr. PR: Port. 3 or equiv. *(Course will not be offered in 1979-80.)*

Courses of Instruction in Russian (Russ.)

Lower Division

1. *Elementary Russian.* I. 3 hr.

2. *Elementary Russian.* II. 3 hr. Continuation of Russ. 1.

3. *Intermediate Russian.* I. 3 hr. PR: Russ. 1, 2, or equiv.

4. *Intermediate Russian.* II. 3 hr. PR: Russ. 3 or consent. Continuation of Russ. 3.

21. *Elementary Programmed Russian I.* I, II. 3 hr. Introduction to the Russian language. Emphasis on developing reading and translating ability. Student proceeds at the student's own pace.

22. *Elementary Programmed Russian II.* I, II. 3 hr. PR: Russ. 21 or Russ. 1 with consent. Continuation of Russ. 21. Emphasis on developing reading and translating ability. Student proceeds at own pace.

23. *Intermediate Russian: Programmed Reading I.* I, II, S. 3 hr. PR: Russ. 22 or equiv.

24. *Intermediate Russian: Programmed Reading II.* I, II, S. 3 hr. PR: Russ. 23 or equiv.

Upper Division

103. *Advanced Russian.* I. 3 hr. PR: Russ. 3, 4, or consent.

104. *Advanced Russian.* II. 3 hr. PR: Russ. 103 or consent.

105. *The Russian Short Story.* I. 3 hr. PR: 12 hr. of Russian or equiv. *(Course will not be offered in 1979-80.)*

*Variable credit courses normally carry 3 hours of credit. Exceptions are made only in emergencies and must be approved by the Department Chairperson and the professor teaching the course.

106. *The Russian Short Story.* II. 3 hr. PR: 12 hr. of Russian or equiv. Continuation of Russ. 105.

109. *Advanced Russian.* I. 3 hr. PR: Russ. 104 or consent.

110. *Advanced Russian.* II. 3 hr. PR: Russ. 109 or consent.

144. *Survey of Russian Literature.* I. 3 hr. PR: Russ. 3, 4, or consent.

145. *Survey of Russian Literature.* II. 3 hr. Continuation of Russ. 144.

292. *Pro-Seminar.* I, II. 1-6 hr.* PR: Russ. 4 or equiv. Special topics.

305. *Reading Russian.* I. 3 hr. PR: Graduate or upper-division standing. Russ. 305-306 is intended for graduate students from other departments to teach them to read general and technical Russian.

306. *Reading Russian.* II. 3 hr. PR: 12 hr. of Russian or equiv. or Russ. 305. Graduate students may meet the doctoral foreign language requirements by achieving a grade of B or better in this course.

Courses of Instruction in Spanish (Span.)

Lower Division

1. *Elementary Spanish.* I, II. 3 hr.

2. *Elementary Spanish.* I, II. 3 hr. Continuation of Span. 1.

3. *Intermediate Spanish.* I, II. 3 hr. PR: Span. 1, 2, or equiv.

4. *Intermediate Spanish.* I, II. 3 hr. PR: Span. 3 or consent. Continuation of Spanish 3.

23. *Intermediate Spanish: Programmed Reading.* I. 3 hr. PR: Span. 1 and 2 or equiv. Intermediate Spanish with concentration on reading comprehension. *(Course will not be offered in 1979-80.)*

24. *Intermediate Spanish: Programmed Reading.* I, II. 3 hr. PR: Span. 1, 2, and 3 or Span. 23 or equiv. Continuation of Span. 23. *(Course will not be offered in 1979-80.)*

33. *Intermediate Spanish: Cultural Emphasis.* I. 3 hr. PR: Span. 2, or equiv.

34. *Intermediate Spanish: Cultural Emphasis.* II. 3 hr. PR: Span. 3, or equiv. Continuation of Span. 33.

Upper Division

103. *Advanced Spanish.* I. 3 hr. PR: Span. 3, 4, or consent.

104. *Advanced Spanish.* II. 3 hr. PR: Span. 103 or consent.

109. *Advanced Spanish.* I. 3 hr. PR: Span. 104 or consent.

110. *Advanced Spanish.* II. 3 hr. PR: Span. 109 or consent.

116. *Spanish Civilization and Culture.* I. 3 hr. PR: 12 hr. of Spanish or equiv.

117. *Spanish-American Literature.* I. 3 hr. PR: 12 hr. of Spanish or equiv.

118. *Spanish-American Literature.* II. 3 hr. PR: 12 hr. of Spanish or equiv.

121. *Peninsular Literature Before 1800.* I. 3 hr. PR: Span. 3 and 4, or equiv., and preferably Span. 109. Reading and discussion of selections from representative works from the beginning of Spanish literature to the end of the eighteenth century together with an examination of those cultural factors which influenced the literature.

*Variable credit courses normally carry 3 hours of credit. Exceptions are made only in emergencies and must be approved by the Department Chairperson and the professor teaching the course.

122. *Peninsular Literature Since 1800.* II. 3 hr. PR: Span. 3 and 4, or equiv., and preferably Span. 109. Readings in Spanish Peninsular literature of the Romantic, Realistic, and Naturalistic schools of the nineteenth century, the Generation of '98, and the various twentieth-century writers down to the present day.

221. *Literature of the Golden Age to 1635.* I. 3 hr. PR: 18 hr. of Spanish or equiv.

222. *The Golden Age After Lope De Vega.* II. 3 hr. PR: 18 hr. of Spanish or equiv.

223. *Estudios de Estillo.* I. 3 hr. PR: 18 hr. of Spanish or equiv.

292. *Pro-Seminar.* 1-6 hr.* Special topics.

315. *Lyric Poetry.* I. 3 hr. PR: 12 hr. of Spanish or equiv.

324. *Explicacion de Textos.* II. 3 hr. PR: 18 hr. of Spanish or equiv. *(Course will not be offered in 1979-80.)*

325. *The Picaresque Novel.* I. 3 hr. PR: 18 hr. of Spanish or equiv.

391. *Cervantes.* II. 3 hr. PR: 18 hr. of Spanish or consent.

392. *Seminar.* 1-6 hr.* Special topics.

395. *Sixteenth Century Literature.* I. 3 hr. PR: 18 hr. of Spanish or consent. *(Course will not be offered in 1979-80.)*

Courses of Instruction in Swahili (Swah.)

1. *Beginning Swahili.* I. 3 hr. Taught by self-instructional method.
2. *Beginning Swahili.* II. 3 hr. Taught by self-instructional method.
3. *Intermediate Swahili.* I. 3 hr. Taught by self-instructional method.
4. *Intermediate Swahili.* II. 3 hr. Taught by self-instructional method.

Geology and Geography

Faculty

Alan C. Donaldson, Ph.D. (Penn. St. U.), *Chairman; Professor of Geology.*
Robert E. Behling, Ph.D. (Ohio St. U.), *Associate Professor of Geology.*
Frank Calzonetti, Ph.D. (U. Okla.), *Assistant Professor of Geography.*
Ping-fan Chen, Ph.D. (V.P.I.), *Adjunct Professor of Geology.*
Chester L. Dodson, M.S. (WVU), *Assistant Professor (part-time) of Geology.*
Gregory A. Elmes, Ph.D. (Penn. St. U.), *Assistant Professor of Geography.*
Robert B. Erwin, Ph.D. (Cornell U.), *Professor of Geology.*
Harry M. Fridley, Ph.D. (Cornell U.), *Professor Emeritus of Geology.*
William Gillespie, M.S. (WVU), *Adjunct Associate Professor of Geology.*
Milton T. Heald, Ph.D. (Harvard U.), *Associate Chairman; Professor of Geology.*
Harley Johansen, Ph.D. (U. Wisc.), *Assistant Chairman; Associate Professor of Geography.*
Peter Lessing, Ph.D. (Syracuse U.), *Adjunct Professor of Geology.*
Richard S. Little, Ph.D. (Syracuse U.), *Associate Professor of Geography.*
John C. Ludlum, Ph.D. (Cornell U.), *Professor Emeritus of Geology.*
Kenneth Martis, Ph.D. (U. Mich.), *Assistant Professor of Geography.*
William Overbey, B.S. (WVU), *Adjunct Associate Professor of Geology.*
Douglas Patchen, Ph.D. (Syracuse U.), *Adjunct Associate Professor of Geology.*
Paul H. Price, Ph.D. (Cornell U.), *Professor Emeritus of Geology.*
Paul W. Queen, M.A. (WVU), *Instructor (part-time) in Geology.*
Henry Rauch, Ph.D. (Penn. St. U.), *Associate Professor of Geology.*
John J. Renton, Ph.D. (WVU), *Professor of Geology.*
Graham D. Rowles, Ph.D. (Clark U.), *Assistant Professor of Geography.*
Ruth A. Rowles, M.A. (U. Wisc.), *Instructor (part-time) in Geography.*
Robert C. Shumaker, Ph.D. (Cornell U.), *Professor of Geology.*

Richard Smosna, Ph.D. (U. Ill.), *Associate Professor of Geology.*
Francis T. C. Ting, Ph.D. (Penn. St. U.), *Associate Professor of Geology.*
Steven M. Warshauer, Ph.D. (U. Cincinnati), *Associate Professor of Geology.*
Dana Wells, Ph.D. (Columbia U.), *Professor Emeritus of Geology.*
Russell L. Wheeler, Ph.D. (Princeton U.), *Associate Professor of Geology.*
Richard T. Williams, Ph.D. (VPI), *Assistant Professor of Geology.*

Bachelor of Science in Geology

The Bachelor of Science degree is designed for students who want to qualify for professional positions in industry and government services, as well as those who plan to do graduate work in geology. A total of 134 hours is required, of which a minimum of 124 hours must be established in subjects exclusive of credits earned in required Physical Education and Math. 2. Electives must be chosen so as to meet the basic requirements of the College of Arts and Sciences. A cumulative average of at least 2.0 is required for courses in geology taken at WVU.

Candidates for the Bachelor of Science in Geology are required to take a total of 40 hours of geology courses. Students are urged to elect some supporting courses in such fields as mining or petroleum engineering, biology, geography, soil mechanics, pedology, and computer science, depending on their major field of geologic studies. Students planning to attend graduate school or seek employment in the oil industry should complete a full year of calculus. A total of 44 hours of non-geology electives are required of which 24 hours are needed to fulfill the University Core Curriculum; the balance can be in geology, cognate fields, and electives of general interest to the student, with the adviser's consent.

Instructional facilities and equipment include the laboratories associated with mineralogy, petrology, geochemistry, sedimentology, paleontology, geomorphology, mineral and fuel resources, and structural geology. Field studies are stressed with geologic mapping at Camp Wood in Greenbrier County; carbonate sediments and their depositional environments in the Florida Keys; sedimentation and coastal processes on the eastern shore of Virginia; pollution measurements in nearby streams and lakes; field trips to glaciated areas; examinations of processes acting on earth's surface in West Virginia; and structural and stratigraphic analyses of the Appalachian basin and orogenic belt. Subsurface logs and samples are available for study in the West Virginia Geological and Economic Survey and the nearby Morgantown Energy Technology Center of the U.S. Department of Energy.

Bachelor of Arts With a Major in Geology

The course requirements for the bachelor of arts with a major in geology are designed for students who want to go into careers that require a good background in the basic principles of geology. Areas such as environmental science, planning, or other earth-related sciences, secondary school teaching, or earth science laboratory technical work may be pursued by proper choice of electives.

After admission to the program continuance in the program for the third and subsequent semesters requires a cumulative average of 2.0 for courses in geology taken in the department.

Major in Geology — B.S.

Required Courses

Geol. 1 or 5, 2, 3, 4, 151, 184, 185, 221, 231, 261, 266, and 4 to 8 hours of geology electives; Chem. 15 and 16; Phys. 1 and 2 or 11 and 12; Math. 3, 4, 15, 16 or Stat. 201; Stat. 101. An advanced allied science course may be substituted for Geol. 231 with adviser consent, if the student is concentrating in geophysics or geochemistry.

Recommended Electives

Geol. 127, 228, 235, 272; Geog. 105, 107; Com. S. 1; C.E. 1; additional biology, chemistry, physics or mathematics courses.

Major in Geology — B.A.

Required Courses

Geol. 1 or 5, 2, 3, 4, 127, 151, 184, 221 or 222, 231 or 235, 261; Chem. 15 and 16; Phys. 1 and 2; Math. 3 and 4; advanced science elective other than geology.

Recommended Electives

See those listed above under Major in Geology — B.S.

Honors Program

Qualified students in geology are encouraged to participate in the department's Honors Program which begins either the second semester of the junior year or the first semester of the senior year and culminates in a senior thesis. Entry requires a 3.0 overall average or consent. (See the department's Honors Coordinator.)

Courses of Instruction in Geology (Geol.)

Lower Division

1. *Physical Geology.* I, II. 3 hr. Description of composition and structure of earth physical processes which change earth's surface. Geol. 2 not required with Geol. 1. Registration in Geol. 2 meets requirements for 4 hr. credit in a laboratory science in physical geology. *(Credit cannot be obtained for both Geol. 1 and Geol. 5.)*

2. *Physical Geology Laboratory.* I, II. 1 hr. May be taken for credit without previous or concurrent geology background.

3. *Historical Geology.* I, II. 3 hr. PR: Geol. 1 or Geol. 5 or Conc. with consent. Evolution of earth and its inhabitants. Accompanied by Geol. 4 to meet requirements of 4 hr. credit in a laboratory science in historical geology.

4. *Historical Geology Laboratory.* I, II. 1 hr. Accompanies Geol. 3. PR or Conc.: Geol. 3.

5. *Introduction to Geology.* I, II. 3 hr. Designed especially for non-science majors. Composition and structure of earth and geologic processes which shape its surface. Geol. 2 not required with Geol. 5. Accompanied by Geol. 2 to meet requirements for 4 hr. credit in a laboratory science in physical geology. *(Credit cannot be obtained for both Geol. 1 and Geol. 5.)*

25. *Geologic Drafting.* I. 1 hr. Some drafting equipment to be purchased by student.

Upper Division

127. *Map Interpretation.* I. 2 hr. PR: Geol. 1 or 5. Relation of earth structure and history to land forms as shown on topographic maps.

151. *Structural Geology.* I. 4 hr. PR: Geol. 1 or 5, and 2 or Minerals 2 or consent; plane geometry, high school algebra, plane trigonometry, and high school physics, or consent. Introduction to stress, strain, and related behaviors of geologic materials in nature, theory, and experiment. Descriptions and theories of brittle and ductile deformation of rocks.

184. *Mineralogy.* I. 4 hr. PR: Geol. 1, Chem. 15, or conc. Elements of crystallography and systematic study of minerals except silicates. Identification of minerals by their physical properties supplemented by blow-pipe analysis.

185. *Mineralogy and Petrography.* II. 4 hr. PR: Geol. 184. Description, mode of occurrence, and classification of silicate minerals and rocks.

201. *Physical Geology for Teachers.* I, II, S. 3 hr. PR: High school teaching certificate and consent. Composition and structure of earth and the geologic processes which shape its surface. *(Credit cannot be obtained for both Geol. 201 and Geol. 1 or 5.)*

202. *Physical Geology Laboratory for Teachers.* I, II, S. 1 hr. Accompanies Geol. 201. Laboratory and field study of earth materials and features, and the topographic and geologic maps used to represent them. *(Course will not be offered in 1979-80.)*

221. *Geomorphology.* I. 3 hr. PR: Geol. 1 or 5. An examination of the physical processes which shape the surface of the earth, with emphasis on fluvial processes and environmental geomorphology. *(Optional field trip at student's expense.)*

222. *Glacial Geology.* II. 3 hr. PR: Geol. 1 or 5. Introduction to glaciology and glacial geology, with emphasis on topographic form and the nature of glacial deposits. The Quaternary history of North America is stressed. *(Optional field trip(s) at student's expense.)*

228. *Photogeology.* II. 3 hr. PR: Geol. 127, 151, or consent. Instruction in basic and advanced techniques of air photo interpretation.

231. *Invertebrate Paleontology.* I. 4 hr. PR: Geol. 3, 4, or consent. Invertebrate fossils: biologic classification, evolutionary development, ecology, and use in correlation of strata.

235. *Introductory Paleobotany.* I, II. 4 hr. PR: Geol. 3. Résumé of development of principal plant groups through the ages, present distribution, mode of occurrence and index species, methods of collection. *(Required Saturday field trips at student's expense.)*

251. *Advanced Topics in Structural Geology.* II. 2-4 hr. PR: Geol. 151, or consent. Oral and written presentations by students and instructor on selected topics in descriptive, regional, experimental, and theoretical structural geology. *(Offered in Spring of odd years.)*

261. *Stratigraphy and Sedimentation.* II. 3 hr. PR: Geol. 1 or consent. Study of sediments and sedimentary rocks. Field techniques stressed as data gathered and interpreted from rocks of Pennsylvanian age in Morgantown vicinity. *(Two-day field trip required. Basic field equipment and field trips at student's expense.)*

266. *Appalachian Geology Field Camp.* S. 6 hr. PR: Geol. 151, 261. Practical experience in detailed geological field procedures and mapping. *(Living expense in addition to tuition must be paid at time of registration.)*

270. *Mineral Resources.* I. 3 hr. PR: Geol. 1, 184. Description, mode of occurrence, and principles governing the formation of ore deposits.

272. *Petroleum Geology.* II. 1-4 hr. PR: Geol. 151. Origin, geologic distribution, methods of exploration and exploitation, uses and future reserves of petroleum and natural gas in the world.

274. *Coal Geology.* I. 3 hr. PR: Geol. 151 or consent. Introduction to the origin, composition, geologic distribution, and exploration of coals.

290. *Geologic Problems.* I, II, S. 1-6 hr. (12 hr. max.). PR: Consent. Special problems for seniors and graduates. Also includes field trips such as Florida Bay carbonate trip.

294. *Introduction to Geochemistry.* II. 4 hr. PR: Chem. 16. Basic review of physical and aqueous chemistry, discussion of basic geochemical processes; calcium carbonate chemistry, diagenetic processes, weathering, the silicate and iron systems.

315. *Environmental Geoscience.* I. 3 hr. PR: Geol. 1 or consent for non-geology majors. Principles, practice, and case histories in application of earth science to environmental problems. Includes: water quality; landslides, subsidence; waste disposal; legal aspects; geologic aspects of land-use planning. *(Field trips and independent field project required.)*

329. *Problems in Geomorphology.* I, II. 1-4 hr.

340. *Advanced Stratigraphy.* II. 4 hr. PR: Geol. 231. Study of principles of rock and time correlation, and their application to the stratigraphy of West Virginia.

341. *Carbonate Sedimentology.* II. 4 hr. PR: Geol. 231 or equiv. Origin and distribution of modern marine carbonate sediments as models for interpretation of ancient limestone and dolomite facies complexes. Laboratory experience in thin section petrography of skeletal and non-skeletal carbonate grains, and rock compositions and fabrics.

344. *Clay Geology.* I, II. 2-3 hr. PR: Geol. 185, 261, 369. Study of clay mineralogy with secondary emphasis on the origin and deposition of clay minerals in the stratigraphic record. *(Course will not be offered in 1979-80.)*

346. *Advanced Sedimentation.* I. 4 hr. PR: Geol. 135. Origin of sedimentary rocks; principles involved in interpretation of ancient geography, climates, animals, and plants. Emphasis on detrital sediments and rocks. *(Required field trips at student's expense.)*

351. *Tectonics.* II. 3 hr. PR: Geol. 151 or consent. Theories of large scale deformational processes operating within the earth's crust and upper mantle. Study of the regional structural geology of selected orogens. *(Offered in Spring of even years.)*

353. *Geophysics.* II. 4 hr. PR: Geol. 151, 261 or equiv. Geologic interpretation of geophysical data with emphasis placed on structural and stratigraphic interpretation of seismic records in explorations for hydrocarbon deposits.

357. *Basin Structures.* I. 4 hr. PR: Geol. 151, 261, or equiv. The origin, development, and distribution of basins and the structure found within basins throughout the world are studied. The distribution of energy-related materials related to basins and structural accumulations are emphasized. *(Offered in Fall of even years.)*

363. *Ground-water Hydrology.* I. 3 hr. PR: Geol. 1 or consent. Study of the principles of ground-water hydrology; occurrence, development, uses, and conservation of ground-water.

364. *Advanced Ground-water Hydrology.* II. 3 hr. PR: Geol. 1, 2, 363 or consent. Review of ground-water exploration, flow, and quality in various geologic terrains. Ground-water pollution and other environmental effects are covered, along with well pumping tests and modeling of ground-water flow.

376. *Coal Petrology.* II. 3 hr. PR: Geol. 274 or consent. Microscopic examination and determination of optical properties of coals, environment of deposition, diagenesis, and metamorphism of coals; coal chemistry and petrography.

385. *Optical Mineralogy.* I. 4 hr. PR: Geol. 185 and one year of physics; undergraduate students need consent. Principles and practice in use of the petrographic microscope in identification of minerals by the immersion method and in thin section. Sedimentary petrology with emphasis on clastics and diagenesis.

394. *Physical Geochemistry.* I. 3 hr. PR: Geol. 1, 184, 185, Chem. 16. Phase diagrams, metamorphic facies, origin of the elements, chemical properties of ions, crystal chemistry of minerals, element distributions and geochemical cycles. *(Offered in Fall of even years.)*

395. *Aqueous Geochemistry.* I, II. 3 hr. PR: Geol. 1, Chem. 16, or consent. Review of basic chemical principles as they apply to aqueous geologic environments. Properties of water and the types, sources, and controls of the common and environmentally significant chemical species dissolved in water.

399. *Quantitative Methods in Geo-Sciences.* II. 3 hr. PR: Stat. 311, or 311 A and B and E, or consent. Brief review and introduction to specific quantitative techniques as applied to geology and geography.

Major in Geography — B.A.

The undergraduate major in geography stresses man's relationship to physical and human environments, and the search for regularity and explanation of the patterns and processes of human activity over the earth's surface. The general course requirements provide training for positions such as cartographer, foreign service officer, planner, and researcher and as market analysts and location planners in various levels of government, business, and industry. Students also are given preparation for elementary and secondary teaching and for graduate studies in such fields as environmental studies, urban affairs, planning, and geography.

The program is structured around a core of geography courses and offers five options designed to provide training for either employment or advanced studies in each emphasis area. The options include Planning, International Studies, Resources and Rural Development, Physical Environment, and also a Generalist option for students who desire to arrange a program with less emphasis on a particular theme. Each option lists a group of required and recommended courses from geography and other departments that are relevant to the particular emphasis area.

Courses Required for All Options

Geog. 7 — Physical Geography
Geog. 8 — Human Geography
Geog. 105 — Resources, Conservation, and Environment
Geog. 109 — Economic Geography
Geog. 140 — United States and Canada
Geog. 261 — Cartography

Generalist Option

Required Courses:
Fifteen additional hours of geography

Planning Option

The Planning option in Geography is designed to provide an introduction to the processes of physical and social planning which shape the spatial order of contemporary society. The option provides a background for careers in urban or regional planning, locational analysis, recreation planning, resource management, and community planning. A planning internship is included within the program and most of the required courses have a practical orientation.

Required Courses:
Geog. 209 — Industrial Location
Geog. 210 — Urban Geography
Geog. 219 — Problems in Geography — Planning Internship
Geog. 225 — Urban Planning Concepts and Techniques
Geog. 230 — Human Settlement Design and Process
Geog. 285 — Methods of Geographic Research
Stat. 101 — Elementary Statistical Inference

Recommended Electives:
Geog. 235 — The Experience of Space
Ag. Ec. 200 — Land Economics
C.E. 232 — Principles of Transportation Engineering
Econ. 257 — Urban Economics
Econ. 213 — Economic Development
Econ. 246 — Transportation
Econ. 255 — Regional Economics
Geol. 221 — Geomorphology
Pol. S. 121 — Introduction to Urban Planning
Pol. S. 225 — Municipal Government
Rc. & Pk. 263 — Program Planning
Soc. & A. 131 — Urban Sociology
Soc. & A. 231 — Society and Health
Soc. & A. 222 — Principles of Community Development
So. Wk. 51 — Introduction to Social Work
Engl. 208 — Scientific Writing
Com. S. 10, 20 and 30

Other recommended electives are tailored to fit the individual interests of the student and include suggested courses in forestry, recreation and parks, landscape architecture, economics, statistics, geology, political science, sociology and anthropology, and engineering.

Resources and Rural Development Option

This option provides a background for the student interested in problems of natural and human resources development in nonmetropolitan and rural settings. In addition to the geographical patterns of resource exploitation and development processes, the selection of courses is designed to emphasize the impact on communities of rapid economic growth or decline, changing population composition, accessibility to services, and environmental issues common in rural areas.

Required Courses:
Geog. 209 — Industrial Location
Geog. 215 — Population Geography
Geog. 219 — Problems in Rural Development
Geog. 230 — Human Settlement Design and Process
Geog. 285 — Methods of Geographic Research
Stat. 101 — Elementary Statistical Inference

Recommended Electives:
Ag. Ec. 211 — Rural Economic Development
Econ. 213 — Economic Development
Econ. 246 — Transportation
Econ. 255 — Regional Economics

M.E.R. 97 — Man's Energy Needs and Resource Limitations
Soc. & A. 222 — Principles of Community Development
Soc. & A. 223 — Sociology of Rural Life
Soc. & A. 241 — Population Dynamics
So. Wk. 51 — Introduction to Social Work
Engl. 208 — Scientific Writing
Stat. 231 — Sampling Methods
For. 226 — Remote Sensing of the Environment

Other courses relevant to Resources and Rural Development may be arranged with the individual student's interests in mind.

International Studies Option

This option allows the student to specialize in one or more regions of the world and gain a basic background in international economic, political, and cultural relationships. The program not only deals with specific regional problems, but also the global issues of colonialism, nationalism, development, international cooperation and trade, multi-national corporations and the competition and relationships between capitalistic, socialistic, and non-aligned nations. The international studies option gives the student an analytical background in international affairs and preparation for graduate work in various fields and employment in government, business, banking, communications, and international organizations.

Required Courses:
Geog. 202 — Political Geography
Geog. 220 — Seminar in Geography — International Studies

Six hours from:
Geog. 141 — Geography of Western Europe
Geog. 142 — Soviet Union and Eastern Europe
Geog. 143 — Geography of Africa
Geog. 144 — Latin America
Geog. 145 — Asia

Recommended Electives:
Econ. 110 — Comparative Economic Systems
Econ. 250 — International Economics
Hist. 264 — American Foreign Policy and Diplomacy
Pol. S. 261 — International Organization
Pol. S. 263 — Public International Law
Engl. 208 — Scientific Writing

Other courses relevant to international studies will be arranged.

Physical Environment Option

The Physical Environment option provides students with an understanding of physical systems in the environment and the interaction between human activity and those systems. The option provides a background for employment or advanced study in environmental impact analysis, remote sensing, photointerpretation, environmental planning, and cartography.

Required Courses:
Geog. 107 — Weather and Climate
Geog. 219 — Problems in Physical Geography
Geog. 285 — Methods of Geographic Research
Geol. 1 and 2 — Physical Geology

Geol. 127 — Map Interpretation
Geol. 221 — Geomorphology
Stat. 101 — Elementary Statistical Inference

Recommended Electives:
Agr. E. 250 — Soil and Water Conservation
Biol. 254 — Plant Geography
Phys. 117 — Descriptive Meteorology
C.E. 5 — Land Surveying
For. 140 — West Virginia's Natural Resources
For. 226 — Remote Sensing of Environment
Engl. 208 — Scientific Writing

Other electives may be arranged as relevant to the student's particular interests.

Honors Program

Qualified students in geography are encouraged to participate in the department's Honors Program which begins either the second semester of the junior year or the first semester of the senior year and culminates in a senior thesis. Entry requires a 3.3 overall average. (See the department's Honors Coordinator.)

Courses of Instruction in Geography (Geog.)

Lower Division

1. *Introduction to Geography.* I, II. 3 hr. Basic principles of the discipline, including maps, climate, physiography, urban, economic, political, and cultural geography. *(Not open to students who have completed either Geog. 7 or 8.)*

7. *Physical Geography.* I, II. 3 hr. An introduction to the various global environmental systems operating on the earth's surface and examination of human interaction with these natural processes.

8. *Human Geography.* I, II. 3 hr. An introduction to the geographical dimension in human behavior and in the man-altered landscape including social, demographic, economic, and political attributes of societies.

Upper Division

105. *Resources, Conservation, and Environment.* I. 3 hr. Distributions of the natural resources in the United States and the factors involved in resource-development, planning of multi-functional land-use, and pollution control and abatement.

107. *Weather and Climate.* 3 hr. Processes of weather and patterns of climate and their significance to man.

109. *Economic Geography.* 3 hr. Earth's land use patterns and interactions that result from man's economic activities. Includes the analysis of industrial location, mineral exploitation, and agricultural patterns.

140. *United States and Canada.* 3 hr. A geographic survey of cultural variation, economic activities, population mobility and urban regions throughout the United States and Canada.

141. *Geography of Western Europe.* 3 hr. Regional characteristics, problems of development, and human ecology of the area.

142. *Soviet Union and Eastern Europe.* 3 hr. Analysis of the physical environment, human resources, and economic utilization of the region.

143. *Geography of Africa.* 3 hr. Systematic and regional characteristics and geographic problems of political, social, and economic development.

144. *Latin America.* 3 hr. Regional study of Central America, the West Indies, and South America emphasizing such physical and human geographical factors as natural resources, climate, population characteristics and trends, culture, economic development, and political patterns.

145. *Asia.* 3 hr. Study of the physical and cultural geographic patterns of Asia with emphasis on China, Japan, India, and countries of southwest and southeast Asia.

202. *Political Geography.* 3 hr. Examines the interrelationship between politics and the environment, human territoriality, the political organization of space, geopolitical aspects of the nation-state and international problems.

209. *Industrial Location.* II. 3 hr. PR: Geog. 109 or consent. Applied theoretical aspects of location decisions in primary, secondary, and tertiary activities. Emphasis will be on the understanding of location patterns and the impact of industries on other characteristics of communities.

210. *Urban Geography.* I. 3 hr. An introduction to the geography of the city incorporating consideration of urban systems and city-region linkages, patterns and processes of urban land use, the social geography of the city, and contemporary urban problems.

215. *Population Geography.* 3 hr. Study of the geographic distribution of population and population characteristics including density, age, fertility, mortality, and settlement patterns. Problems of migration and population/resource issues also will be covered, with an emphasis on developing countries.

219. *Problems in Geography.* I, II. 1-9 hr. PR: Consent. Planning internship, or independent research.

220. *Seminar in Geography.* I, II. 1-9 hr. per sem. PR: Consent. Includes separate seminars in urban, economic, physical, medical, behavioral, social, Appalachian, transportation, environmental, education, census, planning, resource, agricultural, international studies, geographic model building, rural problems, recreation, and cartography.

225. *Urban Planning Concepts and Techniques.* II. 3 hr. PR: Geog. 210 or Pol. S. 121 or consent. Explores concepts, techniques, and processes of physical and social planning and their application to urban problems including: Land use allocation location of economic activity, housing, transportation, and the delivery of services.

230. *Human Settlement Design and Process.* I. 3 hr. Analysis of spatial organization of rural settlements from an ecological perspective. Models of settlement form, function, and process are developed, and issues of efficiency and community design are examined using examples from different cultures.

235. *The Experience of Space.* II. 3 hr. Explores the individual's changing experience of geographical space over the lifecycle as reflected in activity patterns, territoriality, and environmental images. Traces environmental design implications for settings including schools, nursing homes, parks, and shopping malls.

261. *Cartography.* 3 hr. An introduction to map appreciation and the theory and practice of map design.

285. *Methods of Geographic Research.* 1-6 hr. PR: Consent. Practical experiences in field mapping, field interviewing, library research, spatial sampling, data analysis, and report preparation and presentation.

299. *Honors Thesis.* I, II, S. 3-6 hr. PR: Departmental consent. Thesis proposal, writing, and defense for students admitted to the Honors Program.

History

Faculty

William T. Doherty, Jr., Ph.D. (U. Mo.), *Chairman and Professor.*
William S. Arnett, Ph.D. (Ohio St. U.), *Assistant Professor.*
Wesley M. Bagby, Ph.D. (Columbia U.), *Professor.*
William D. Barns, Ph.D. (WVU), *Professor.*
John A. Caruso, Ph.D. (WVU), *Professor Emeritus.*
Elizabeth Cometti, Ph.D. (U. Va.), *Professor Emerita.*
Charles W. Connell, Ph.D. (Rutgers U.), *Associate Professor.*
Arthur L. Donovan, Ph.D. (Princeton U.), *Associate Professor.*
Jack L. Hammersmith, Ph.D. (U. Va.), *Assistant Chairman and Associate Professor.*
Elizabeth K. Hudson, Ph.D. (Ind. U.), *Associate Professor.*
Carl M. Hunt, M.A. (WVU), *Instructor (part-time).*
Mortimer Levine, Ph.D. (U. Penn.), *Professor.*
Stephen C. McCluskey, Ph.D. (U. Wisc.), *Visiting Assistant Professor.*
William T. McLeod, Ph.D. (U. Md.), *Associate Professor.*
Robert M. Maxon, Ph.D. (Syracuse U.), *Associate Professor.*
John A. Maxwell, Ph.D. (WVU), *Associate Professor.*
Dennis H. O'Brien, Ph.D. (U. Ill.), *Associate Professor.*
George P. Parkinson, Jr., Ph.D. (U. Wisc.), *Associate Professor; Curator, West Virginia Collection.*
Kurt Rosenbaum, Ph.D. (Syracuse U.), *Professor.*
Sarah R. Smith, Ph.D. (Columbia U.), *Associate Professor Emerita.*
Edward M. Steel, Jr., Ph.D. (U. N.C.), *Professor.*
John C. Super, Ph.D. (UCLA), *Assistant Professor.*
John A. Williams, Jr., Ph.D. (Yale U.), *Professor.*

Major in History

Required Courses

History majors must meet University and College requirements for the Bachelor of Arts degree. The Department of History requires the following:

1. History majors must complete a total of 30 hours of work in History, of which at least 18 hours are to be selected from upper-division courses. Majors should divide these 30 hours between American and non-American courses. (See Groups I and II below.)

2. History majors are required to complete 6 hours of work in both Political Science and Economics.

3. History majors are required to complete a minor of 9-12 upper-division hours in a related subject.

4. History majors are required to achieve a 2.0 (C) average for all courses attempted in the major subject.

History Courses

Group I (American): Hist. 52, 53, 151, 153, 155, 156, 157, 159, 161, 175, 251, 252, 253, 255, 257, 259, 261, 263, 264, 266, 267, 268, 269, 271, 272, 273, 274.

Group II (Non-American): Hist. 1, 2, 11, 12, 101, 103, 105, 107, 109, 117, 118, 119, 120, 121, 131, 132, 141, 142, 200, 201, 202, 205, 206, 207, 208, 209, 210, 213, 214, 215, 216, 217, 218, 222, 225, 226, 227, 228, 229, 230, 231, 232, 241, 242.

With the approval of the student's adviser and the chairman of the department, the student may elect options at the 300-course level. (See the *Graduate School Catalog.*)

Program in the History of Science and Technology

The College of Arts and Sciences and the Department of History has inaugurated a program in the history of science and technology. Students interested in pursuing courses in this area should begin by taking either Hist. 11 and 12 or 207 and 208. Further information is available at the Department of History office.

Courses of Instruction in History (Hist.)

Lower Division

1. *Western Civilization: Antiquity to 1600.* 3 hr. A survey of the major developments in Western civilization beginning with the ancient Mediterranean world and concluding with Reformation Europe. *(Does not have to precede Hist. 2.)*

2. *Western Civilization: 1600 to Present.* 3 hr. A survey of major developments in Western civilization from 1600 to the present with attention to Europe's emerging industrial society and changing role in world affairs. *(May precede Hist. 1.)*

11. *Science, Magic, and Religion.* 3 hr. Examination of the historical development of scientific ideas from beginning of western culture through establishment of Newtonian natural philosophy.

12. *Modern Science: Forces, Energy, Order.* II. 3 hr. Examination of the historical development and interaction of major themes of scientific thought from the beginning of the eighteenth century through the industrial revolution to the present.

52. *Growth of the American Nation to 1865.* 3 hr. Examines the basic political, economic, and social forces in formation and development of United States before 1865. Emphasis on national development from independence through Civil War.

53. *Making of Modern America, 1865 to the Present.* 3 hr. Continues the examination of basic political, economic, and social forces in the development of the United States since the Civil War.

Upper Division

101. *History of Ancient Times: Stone Age to the Fall of Rome.* 3 hr. Ancient civilizations of the Near East and the Mediterranean.

103. *Medieval Europe: Fall of Rome to the Renaissance.* 3 hr. Historical development of civilization in Europe from 300 to c. 1300 A.D. Semi-topical approach with attention to problems of church development, cultural conflict, church-state relations, social-economic expansion, and intellectual evolution. *(Course will not be offered in 1979-80.)*

105. *Early Modern Europe: Renaissance to the Enlightenment.* 3 hr. Concentrates on major problems of a political and social nature which affected the course of European events between 1500-1763. Some of the problems to be analyzed are the Reformation crisis, the seventeenth century struggle for effective government in England and France, the realignment of European powers, and the rise of modern science.

107. *Revolutionary Europe.* 3 hr. Traces the development of European history from the eve of the French Revolution to the end of the Franco-Prussian war. Political and social history emphasized.

109. *Twentieth Century Europe.* 3 hr. Traces the major political, economic, and social developments of Europe from World War I to the present time.

111. *Special Topics in History.* I, II, S. 1-3 hr. Selected topics in history. May be repeated for a maximum of 9 credit hours as long as content for each semester of Hist. 111 is different.

117. *History of Russia: From Kiev to Nicholas I.* 3 hr. Interdisciplinary approach integrating political, social, economic, diplomatic, and cultural studies to provide more than an introduction to the history of Russia. In-depth study of the various aspects of Russian life in an attempt to provide an understanding of the forces which produced the Russian autocracy.

118. *History of Russia: From the Emancipation to the Present.* 3 hr. Using the same approach as in Hist. 117 an attempt is made to follow the changes which turned an underdeveloped country into one of the major world powers.

119. *British Civilization to 1660.* 3 hr. History of Britain, mainly England, from the earliest times to the Restoration. Political, constitutional, diplomatic, economic, social, religious, intellectual, and cultural developments considered.

120. *British Civilization Since 1660.* 3 hr. History of Britain, mainly England, from the Restoration to the present.

121. *History of Modern Germany.* 3 hr. German history from Congress of Vienna to end of World War II. Student gains special knowledge of more specialized topics by selecting literature and writing essays on these topics.

131. *Non-Western Civilization Before 1800.* 3 hr. History of selected areas of Africa, East Asia, and the Near East before the impact of western colonialism. Emphasis is placed on politics, economic and social developments, and religion.

132. *Non-Western Civilization Since 1800.* 3 hr. History of selected areas of Africa, East Asia, and the Near East during the period of western domination, colonialism, and emergence of independent states.

141. *Latin American History, Colonial Period and the Wars of Independence.* 3 hr. The Aztec, Maya, and Inca cultures, European conquests, political, economic, and cultural institutions of Spanish and Portuguese empires in America, and the revolutionary forces and military campaigns that led to the founding of the present Latin American republics.

142. *Latin American History Since 1824.* 3 hr. Political events and economic and cultural forces of the twenty Latin American countries from the dawn of nationalism to the present.

153. *West Virginia.* 3 hr. Historical foundations and development of West Virginia, with particular emphasis upon the growth of the government, the economy, and the traditions of the state.

155. *History of American Colonial Society, 1607 to 1763.* 3 hr. The planting and maturation of the English colonies of North America. Relationship between Europeans and Indians, constitutional development, religious ferment, and the colonial economy are studied.

156. *History of the American Revolution, 1763 to 1790.* 3 hr. The immediate origins and long-range consequences of the movement for independence from Great Britain; includes the 1775-1790 controversy over the character of new state and federal governments.

157. *The Early Republic, The United States, 1781 to 1861.* 3 hr. (Completion of Hist. 52 is advised.) American history from the Revolution to the Civil War is followed in detail, with particular attention to the formation and operations of government under the Confederation and the Constitution, the development of political parties, the beginnings of industrialization, and the sectional struggles that culminated in war.

159. *The United States, 1865-1918.* 3 hr. Social, intellectual, economic, political, and diplomatic development of the United States during the most intensive phase of American industrialization; special emphasis on ideas of selected Americans on how to cope with the increase in poverty and social malaise which accompanied economic development; attention also given to the roots of American imperialism. (Hist. 53 is recommended as preparation.)

161. *Recent America. The United States Since 1918.* 3 hr. The 1920's, the New Deal, World War II, and a survey of developments since World War II. *(Primarily for non-History majors.)*

175. *The Coal Industry in America.* 3 hr. The historical development of the coal industry. The technology of extraction, the political and economic context, the United Mine Workers of America, and the particular social problems of the industry will be emphasized.

200. *Greece and Rome.* 3 hr. Covers the Minoan and Mycenaean civilizations, Archaic and Classical Greece, Alexander the Great and the Hellenistic Age, the Roman Republic, the Etruscan and Carthaginian states, and the rise of the Roman Empire.

201. *Social and Economic History of the Middle Ages, 300-1000.* 3 hr. (Hist. 103 recommended as preparation.) The social-economic crisis of the late Roman and German institutions, the Merovingian and Carolingian economies, Pirenne Thesis, and transition to feudal society. *(Course will not be offered in 1979-80.)*

202. *Social and Economic History of the Middle Ages, 1000-1500.* 3 hr. (Hist. 103, 201 recommended as preparation.) Feudal society, land and population expansion, fairs, towns, leagues, Italian leadership, crusades, church influence, black death, fourteenth century revolts, and general decline of late Middle Ages.

205. *The Renaissance.* 3 hr. The underlying political, economic, and social structure of fourteenth and fifteenth century Italy with concentration on the significant intellectual and cultural trends which characterized the age. Consideration given to the problem of the impact of early Reformation movement upon Renaissance culture.

206. *The Reformation.* 3 hr. Distinguishing theological characteristics of the major Reformation movements with concentration on the effect of religious-intellectual crisis on the political and social structure of the sixteenth century.

207. *Early European Science and Culture.* 3 hr. Examination of European intellectual history from the Renaissance to the early eighteenth century with particular attention being paid to the contributions of Copernicus, Bacon, Descartes, Kepler, Galileo, and Newton.

208. *Science and Society, 1750-1914.* 3 hr. Historical examination of the relationship between science and technology with particular attention being paid to the doctrines of Positivism, Darwinism, and Scientific Socialism.

209. *The ABC Powers of Latin America.* 3 hr. Political events and economic and cultural institutions of Argentina, Brazil, and Chile from independence to present day.

210. *Modern Spain.* 3 hr. Spanish political, economic, and cultural developments from national unification under Ferdinand and Isabella to Francisco Franco. Includes Portuguese history from 1580 to 1640.

213. *Bourbon France.* 3 hr. French history from reign of Henry IV to reign of Louis XVI. Special attention given to reigns of Louis XIII and Louis XIV. Political, cultural, and intellectual history. *(Course will not be offered in 1979-80.)*

214. *The Revolutionary-Napoleonic Era.* 3 hr. Traces French history from mid-eighteenth century to 1815. Special attention given to the background of the French Revolution of 1789, to the political and social history of the revolution, and to Napoleon's nonmilitary achievements.

215. *European Diplomatic History, 1815 to 1919.* 3 hr. Develops an understanding of the forces, men, and events which determined diplomatic relations between the major powers.

216. *European Diplomatic History, 1919 to Present.* 3 hr. Scope similar to Hist. 215.

217. *Diplomatic History of the U.S.S.R., 1917 to 1939.* 3 hr. Detailed study of Soviet diplomatic history, with emphasis on the view from the Kremlin balanced by the responses of other powers. Understanding of European diplomatic history desirable.

218. *Diplomatic History of the U.S.S.R., 1939 to Present.* 3 hr. Scope similar to Hist. 217.

222. *Twentieth-Century Germany from Weimar to Bonn.* 3 hr. The Weimar Republic, the Third Reich, and the two German states created after World War II. *(Course will not be offered in 1979-80.)*

225. *History of Modern China.* 3 hr. Introduction to modern China (since 1839) with some attention to China's Confucian heritage; the Chinese effort to modernize in the face of Western diplomatic and economic pressure; specific attention to China's Nationalist and Communist revolutionary traditions.

226. *History of Modern Japan.* 3 hr. Modern Japan (since 1868) with some attention to development of Japanese institutions and ideas in earlier periods, especially the Tokugawa Era (1600-1868); the rapid pace of economic change in nineteenth and twentieth centuries along with important social, political, and diplomatic implications of this change.

227. *East Africa to 1895.* 3 hr. History of East Africa from earliest man to beginning of European control. Population movement and interaction, development of varying types of polity, revolutionary changes, and European scramble for East Africa form major focus. *(Course will not be offered in 1979-80.)*

228. *East Africa Since 1895.* 3 hr. History of colonial rule and movement to independence in East Africa. Political, economic, and social changes will be examined with particular emphasis on rise and triumph of African nationalism. *(Course will not be offered in 1979-80.)*

229. *History of Africa: Pre-Colonial.* 3 hr. History of Africa from earliest man to the middle of the nineteenth century. Particular emphasis on population movement and interaction, state formation, and the development of trade in subsaharan Africa as well as the impact of such external influences as Christianity and Islam.

230. *History of Africa: European Dominance to Independence.* 3 hr. History of Africa from the middle of the nineteenth century to the 1960's. In the first half of the course, the establishment and functioning of European colonial regimes in African history, and recent interpretations in the field.

231. *Seventeenth Century Britain, 1603-1715.* 3 hr. The more significant political, social, economic, religious, and intellectual developments of Britain during a century of revolution and of the men and women who interacted with those movements. *(Course will not be offered in 1979-80.)*

232. *Eighteenth Century Britain, 1715-1832.* 3 hr. The "Age of Aristocracy," the political, social, religious, economic, and intellectual forces which produced it, and the reasons for its decline under the combined impact of the Industrial, Agricultural, American, and French revolutions. *(Course will not be offered in 1979-80.)*

241. *English Social History, Fourteenth to Eighteenth Century.* 3 hr. Topical examination of English society from the time of Chaucer to Milton. Major topics: society in town and country, economy, politics, religion, and thought.

242. *English Social History, Eighteenth Century to the Present.* 3 hr. Topical examination of English society from the time of Queen Anne to the present.

251. *History of Black People in America to 1900.* 3 hr. Slave trade and evolution of slavery in New World, attack upon slavery and its destruction, the South and Negro during Reconstruction, and age of Reaction and Racism, 1875-1900.

252. *History of Black People in America Since 1900.* 3 hr. Race conflict and black migration, blacks in American world wars, desegregation practices both in the South and North, and trends toward black nationalism.

253. *Civil War and Reconstruction.* 3 hr. Causes as well as constitutional and diplomatic aspects of the Civil War; role of the American Negro in slavery, in war, and in freedom; and economic and political aspects of Congressional Reconstruction. *(Course will not be offered in 1979-80.)*

255. *The Cleveland Era.* 3 hr. The "Gilded Age," with emphasis on political and social impacts of urban-industrial growth. Growth of large cities and a national communications network, rise of the corporation, subordination of regional interests and racial minorities, political protest movements and changes in the structure and sociology of politics, with special attention to the Congress and the Presidency. *(Course will not be offered in 1979-80.)*

257. *The United States From McKinley to the New Deal, 1896 to 1933.* 3 hr. American national history from William McKinley to Franklin D. Roosevelt. Particular attention given to great changes in American life after 1896; national political, economic, social, and cultural development; the Progressive Era in American politics; and alterations in American foreign relations resulting from the Spanish-American War and World War I. *(Course will not be offered in 1979-80.)*

259. *Recent American History, 1933 to Present.* 3 hr. American national history from inauguration of Franklin D. Roosevelt to present. Emphasis on New Deal; Roosevelt's foreign policies and their impact on American social, technological, and cultural developments; and United States domestic problems and foreign relations since 1945. *(Course will not be offered in 1979-80.)*

261. *Economic and Social Development of West Virginia.* 3 hr. Regional study of the economic, social, technological, cultural, and religious history of West Virginia.

263. *American Diplomacy to 1918.* 3 hr. American foreign policy and diplomacy from adoption of Constitution to end of World War I. (Assumes some knowledge of period such as obtained in Hist. 52 and 53.)

264. *American Foreign Policy and Diplomacy, 1918 to the Present.* 3 hr. America's foreign policy and growing involvement in international relations including our role in World War II, Korean War, and Vietnam. (Assumes student has some knowledge of period such as obtained in Hist. 2, 53, or 161.)

266. *American Economic History to 1865.* 3 hr. Origins and development of American business, agricultural, and labor institutions, problems, and policies, from 1600 to 1965; influence of economic factors upon American history during this period. *(Course will not be offered in 1979-80.)*

267. *American Economic History Since 1865.* 3 hr. Covers 1865 to present. Scope similar to that stated for Hist. 266.

268. *The Old South.* 3 hr. History of the South — exploring peculiar differences that led to an attempt to establish a separate nation. The geographical limitation permits a detailed study of economic and social forces within the context of the larger national history. (For advanced undergraduates and graduates.)

269. *The New South.* 3 hr. Integration of the South into the nation after Civil War. Emphasis on southern attitudes toward industrialization, commercial agriculture, organized labor, and the Negro. Special attention to the southern literary renaissance and conservative and progressive politics of the southern people. *(Course will not be offered in 1979-80.)*

271. *The American Frontier East of the Mississippi.* 3 hr. Westward expansion from discovery of America to Louisiana Purchase. Emphasis on frontier section region from the Tidewater to the Mississippi Valley. *(Course will not be offered in 1979-80.)*

272. *The American Frontier West of the Mississippi.* 3 hr. Westward expansion from the Louisiana Purchase to the passing of the frontier in 1893. Original investigation and reassessment of a number of controversial problems. *(Course will not be offered in 1979-80.)*

273. *The City in American History.* I. 3 hr. The Era of Commerce, 1630-1895: concerning the settlement, design, and growth of North American commercial and administrative centers particularly transportation development and the role of urban elites in shaping national economic policies.

274. *The City in American History.* II. 3 hr. The Industrial Age, 1820-present: focusing on the interaction of industrialization and urbanization during the nineteenth and twentieth centuries particularly the impact of technology upon urban life and the role of cities in national politics.

Humanities

Jack Welch, M.F.A. (U. Iowa), *Coordinator of Humanities and Associate Professor of English.*

The study of humanities means pursuing the accumulated knowledge and experience contained in world literature, history, fine arts, religion, and philosophy in an interdisciplinary framework with the objective of bringing the student to an active consciousness of the living, operating, and continuing values in human culture.

Courses of Instruction in Humanities (Hum.)

Lower Division

1, 2. *Introduction to the Course of Western Civilization.* I, II. 3 hr. per sem. First semester treats the high points of Greco-Roman and Medieval European civilizations: their art, architecture, philosophy, religion, literature, and culture. Second semester shows how these ideas and achievements were modified and added to during the Renaissance, the Age of Classicism, and the revolutionary nineteenth century. Sir Kenneth Clark's film series *Civilisation* will be shown during the year and other audio-visual performances will help enlighten the student. Each student attends a discussion group limited to about twenty. (Two lectures, one discussion per week.)

3, 4. *Honors Seminar in Humanities.* I, II. 3 hr. per sem. Honors courses for selected students mirroring Hum. 1 and 2 respectively. Affords participants a wider opportunity for discussion than in Hum. 1 and 2 and for reading the classic statements on the nature of civilization.

10. *The Classic Forms of the Hero in Western Civilization.* I. 3 hr. Courage and the classic forms of the hero in the twentieth century. Historical study of art, literature, philosophy, and religious thought from the Greek classics to contemporary novels and films. (Two lectures, one discussion per week.)

11. *The Figure of the Absurd Hero in Western Civilization.* II. 3 hr. Courage and the figure of the "absurd hero" in the twentieth century. Historical study of literature, art, religion, and philosophy from the New Testament to contemporary novels and films. (Two lectures, one discussion per week.)

Upper Division

191. *Special Topics.* I or II. 3 hr.

Library Science

Faculty

Robert F. Munn, Ph.D. (U. Mich.), *Chairman and Professor; Dean of Library Services.*
Stokely B. Gribble, M.S.L.S. (U. Ky.), *Assistant Professor; Associate Dean of Library Services.*
Clifford C. Hamrick, M.L.S. (Rutgers U.), *Assistant Professor; Chief Reference Librarian.*
Elizabeth F. Howard, Ph.D. (U. Pitt.), *Assistant Professor.*
Theodore M. Judy, M.A.L.S. (WVU), *Assistant Professor; Physical Science Librarian.*
Evelyn M. Kocher, M.S.L.S. (U. N.C.), *Assistant Professor; Chief Catalog Librarian.*
Barbara Mertins, M.S.L.S. (Syracuse U.), *Assistant Professor.*
Ida G. Byer, M.L.S. (U. Pitt.), *Assistant Professor; Chief of Acquisitions.*

Mildred I. Moyers, M.S.L.S. (Case West. Res. U.), *Assistant Professor; Chief Bibliographer.*
Harold B. Shill, Ph.D. (U. N.C.), *Assistant Professor; Chief Circulation Librarian.*

Program

The Department of Library Science has two emphases: (1) Courses are offered for all students to help them to make effective use of the library and to acquaint them with major sources of information in their particular fields; (2) Courses are available for students in elementary or secondary education who desire to qualify for certification as a school library media specialist.

Courses of Instruction in Library Science (L. Sci.)

1. *Using Books and Libraries.* I, II. 1 hr. Provides a working knowledge of library facilities, particularly of the University Library. Includes how and when to use basic reference sources and search strategy for term paper preparation. Useful to any student in the University.

190. *Teaching Practicum.* I, II. 1-3 hr. PR: Consent.

201.* *Reference and Bibliography.* I, S. 3 hr. PR: L. Sci. 1 or consent. Basic reference books, dictionaries, encyclopedias, indexes, yearbooks, and other reference materials are studied and evaluated, with emphasis on the theory and practical experience with reference books for print and non-print materials.

203.* *Literature for Children.* I, II, S. 3 hr. A survey of children's literature including its historical development as well as current trends. Emphasizes selection, critical evaluation, and utilization of literary materials for developmental, recreational, and curriculum needs. Appropriate media included.

205.* *Selection of Books and Related Materials for the Secondary School Library.* I, II, S. 3 hr. Survey of adolescent literature and other library materials adapted to the needs of junior and senior high school students.

207.* *Organization and Administration of the Instructional Materials Center in the Secondary School.* I, S. 3 hr. PR: L. Sci. 205, 223. For school librarians. Study of organization and administration, including planning, equipment, routines, and schedules, and the role of the librarian in the instructional program.

222.* *Field Practice.* I, II, S. 3 hr. PR: L. Sci. 201, 203, 205, 223, 207, or 235. Practical experience in a variety of public, school, and special libraries, and instructional materials centers, under the supervision of experienced librarians and media specialists. Students must complete 100 clock hours.

223.* *Cataloging and Classification.* II, S. 3 hr. Basic principles and problems of cataloging and classification combined with practical experience in processing the various types of books and materials. Problems peculiar to the teacher-librarian considered.

235.* *Organization and Administration of the Instructional Materials Center in the Elementary School.* II, S. 3 hr. PR: L. Sci. 223. For school librarians. Includes planning quarters; selection, acquisition, and organization of books and other materials; supervision of library assistants; relations with faculty, administration, and community.

326. *Bibliography of the Social Sciences.* I. 1 hr. Covers bibliographic structure and information sources in psychology, sociology, political science, economics, history, education and related disciplines. Provides a good working knowledge of information retrieval tools and the ability to use libraries effectively.

*Presently required for Certification in West Virginia.

330. *Library Resources for the School Curriculum.* II. 3 hr. Library and community resources, print and non-print, for curriculum enrichment. Presented to elementary and secondary teachers and to librarians to help them give more effective services.

Mathematics

Faculty

Iland D. Peters, M.S. (WVU), *Chairman and Professor.*
William N. Anderson, Jr., Ph.D. (Carnegie-Mellon U.), *Associate Professor.*
Anand M. Chak, Ph.D. (Lucknow U., India), *Professor.*
Jean M. Coover, M.A. (WVU), *Assistant Professor.*
Evin J. Cramer, Ph.D. (U. Tex., Arlington), *Assistant Professor.*
Allen B. Cunningham, Ph.D. (WVU), *Professor Emeritus.*
Hannibal A. Davis, Ph.D. (Cornell U.), *Professor Emeritus.*
James B. Derr, Ph.D. (Mich. St. U.), *Associate Professor.*
Harvey R. Diamond, Ph.D. (MIT), *Assistant Professor.*
James E. Dowdy, Ph.D. (Okla. St. U.), *Associate Professor.*
Joy B. Easton, M.S. (WVU), *Assistant Professor.*
James C. Eaves, Ph.D. (U. N.C.), *Professor Emeritus.*
Judith Gibbs, M.A. (WVU), *Lecturer.*
Helen L. Godfrey, M.S. (WVU), *Assistant Professor.*
Mark I. Goldstein, M.S. (WVU), *Lecturer.*
Jack T. Goodykoontz, Ph.D. (U. Ky.), *Associate Professor.*
Henry W. Gould, M.A. (U. Va.), *Professor.*
Judith C. Hall, M.S. (Harvard U.), *Assistant Professor.*
Lois V. Heflin, M.S. (WVU), *Assistant Professor (part-time).*
Carol Henry, M.A. (U. Pitt.), *Instructor (part-time).*
D. Michael Henry, Ph.D. (TCU), *Associate Professor.*
Franz X. Hiergeist, Ph.D. (U. Pitt.), *Associate Professor and Associate Chairman.*
Caulton L. Irwin, Ph.D. (Emory U.), *Associate Professor.*
Alonzo F. Johnson, Ed.D. (Okla. St. U.), *Professor.*
Jin B. Kim, Ph.D. (VPI), *Professor.*
Ron King, M.S. (WVU), *Lecturer.*
Wilma J. Loudin, M.S. (WVU), *Assistant Professor.*
Joseph M. McDonough, Ph.D. (Rutgers U.), *Assistant Professor.*
Michael E. Mays, Ph.D. (Penn. St. U.), *Assistant Professor.*
Betty L. Miller, M.S. (WVU), *Associate Professor.*
James E. Miller, Ph.D. (U. Ky.), *Associate Professor.*
Carol O'Dell, M.A. (WVU), *Lecturer.*
William C. Peterson, Ph.D. (Iowa St. U.), *Assistant Professor.*
John W. Randolph, Ph.D. (U. Va.), *Associate Professor.*
Samuel M. Rankin III, Ph.D. (Vanderbilt U.), *Assistant Professor.*
Donald F. Reynolds, Ph.D. (TCU), *Associate Professor.*
Linda Saus, M.S. (WVU), *Lecturer (part-time).*
John W. Schleusner, Ph.D. (U. Ala.), *Associate Professor.*
Cathy Shay, M.S. (WVU), *Lecturer (part-time).*
Witold Sieradzan, M.A. (San Fran. St. U.), *Lecturer.*
William H. Simons, Ph.D. (Carnegie-Mellon U.), *Associate Professor.*
Joseph K. Stewart, Ph.D. (WVU), *Professor Emeritus.*
Robert L. Taft, M.S. (WVU), *Lecturer.*
Marvin L. Vest, Ph.D. (U. Mich.), *Professor Emeritus.*

Programs

The Department of Mathematics provides a curriculum which contains programs for an undergraduate major in mathematics, for the pre-service elementary and secondary teacher, for the student who is interested in the appli-

cations of mathematics to the fields of computer science, statistics, engineering, physical, natural and social science, and business and economics. Also included in the curriculum are courses designed to acquaint the non-science major with the ideals and objectives of mathematics.

Freshmen and sophomores who plan to major in mathematics and who also wish to meet the requirements for certification as secondary teachers of mathematics should plan their programs carefully in order to meet both sets of requirements within the four academic years.

Students who expect to major in mathematics should maintain a grade-point average of not less than 2.5 in lower-division mathematics course work.

Placement examinations for freshmen will be given during the summer orientation program and just before registration for the first semester of the academic year. The department, on request from a high school principal, will provide placement test service at the high school during the latter part of the second semester for interested graduating seniors.

Entering students also may be placed on the basis of scores made on Advanced Placement Examinations (College Entrance Examination Board) and American College Testing Program (ACT) scores.

Students who are registered at WVU may earn credit for a number of mathematics courses by examination. Examinations will be given at two separate times during each semester. Infórmation concerning the regulations pertaining to credit by examination, courses listed, where and when to apply, time and place of examinations may be obtained from the Academic Advising Center.

Major in Mathematics

The Department of Mathematics requires a minimum of 39 hours of mathematics for the Bachelor of Arts degree. Pre-calculus courses cannot be counted toward the fulfillment of this requirement.

Required Courses

Ordinarily, the following courses will be required: Math. 15, 16, 51, 141, 143, 163, 181, 251, and 252. However, in certain instances, departmental advisers may approve appropriate substitutions.

Recommended Electives

Selection of elective courses should be made in consultation with a departmental adviser and should be based on the student's interests and career objectives. More detailed information on recommended courses is available in the Department of Mathematics.

Courses of Instruction in Mathematics (Math.)

Pre-College

2. *Algebra.* I, II. 3 hr. PR: 1 unit algebra. Credits earned in Math. 2 are not counted in the 128 hours required for graduation by the College of Arts and Sciences.

Lower Division

3. *College Algebra.* I, II. 3 hr. PR: 1½ units algebra or Math. 2, and 1 unit geometry, and satisfactory performance on departmental diagnostic examination. *(Not open to students who have credit for the equivalent of Math. 14.)*

4. *Plane Trigonometry.* I, II. 3 hr. PR: 1½ units algebra or Math. 2, and 1 unit geometry. *(Not open to students who have credit for the equivalent of Math. 14.)*

11. *Symbolic Logic II.* I, II, S. 3 hr. PR: Phil. 10. A continuation of Phil. 10, but branching into applications, analogues and alternative systems of logic. Topics include relational predicate logic, identity, definite descriptions; Boolean algebras; switching circuits; modal, many-valued and other alternative logics; philosophical applications. *(Equiv. to Phil. 11.)*

14. *Pre-Calculus Mathematics.* I, II. 4 hr. PR: 2 units algebra and 1 unit geometry. A treatment of algebra, analytic geometry, and trigonometry necessary for the study of calculus. *(Not open to students who have credit for the equivalent of either Math. 3 or 4.)*

15, 16. *Single Variable Calculus I and Single Variable Calculus II.* I, II. 4 hr. per sem. PR: 2 units algebra, ½ unit trigonometry, or Math. 3 and 4, or 14. Introduction to plane analytic geometry, and an intuitive but thorough development of the calculus of one variable including infinite series and solution of basic differential equations.

17. *Applied Mathematics I.* I, II. 4 hr. PR: Math. 16. Primarily for engineers and scientists. Ordinary differential equations, Laplace transforms, matrices. Applications to physics, chemistry, and engineering.

18. *Applied Mathematics 2.* I, II. 4 hr. PR: Math. 17. Primarily for engineers and scientists. Calculus of several variables, line and surface integrals, Fourier series, partial differential equations, probability and statistics. Applications.

2. 32 *Introduction to Mathematics.* I, II. 2 hr. per sem. PR: 1 unit algebra. Designed for non-science majors who do not need the techniques of mathematics for other course work in their programs. Topics in modern mathematics.

28 *Finite Mathematics.* I, II. 3 hr. PR: Two years high-school algebra or Math. 3. Logic, sets, partitions, probability theory, vectors, matrices, linear programming and applications in commerce.

33, 34. *Introductory Mathematics for Elementary Teachers.* I, II. 3 hr. per sem. PR: One unit high-school algebra. For elementary education majors. Structure of the number systems; techniques of arithmetic computation derived from the properties of the real number system; informal geometry.

51. *Multivariable Calculus.* I, II. 4 hr. PR: Math. 16. Introduction to solid analytic geometry, calculus of several variables; introduction to differential equations.

Upper Division

113. *Differential Equations.* I, II. 3 hr. PR: Math. 18 or 51. Analysis of ordinary differential equations including: existence and uniqueness of solutions; methods of solution; oscillatory, stability and asymptotic properties of solutions; boundary value problems, linear and non-linear systems.

123. *Discrete and Numerical Methods.* I. 4 hr. PR: Com. S. 2, Math. 16, Stat. 101 (or Conc.). Set algebra, propositional logic and applications to circuits. Directed and undirected graphs, trees, errors in numerical computation, interpolation, quadrature, solution of non-linear and differential equations, finite markov chains, queuing theory. *(Equiv. to Com. S. 120.)*

125. *Theory of Games.* II. 3 hr. PR: Math. 16 or consent. Elements of matrix algebra and probability. Theory of games, including decision theory, linear and dynamic programming, and strategy.

128. *Introduction to Calculus.* I, II. 3 hr. PR: Math. 3 or 14 or consent. For students in other disciplines needing calculus for applications. Limits of sequences and functions, continuity, derivatives, and integrals of polynomials, rational functions, and exponential and logarithmic functions, partial derivatives, maxima and minima.

131. *Structure of the Real Numbers.* II. 3 hr. PR: Math. 34. For elementary education majors. Real numbers applied to graphing, problem solving, probability and statistics, calculations and the computer.

133. *Introductory Modern Algebra for Teachers.* I. 3 hr. PR: Calculus or consent. Not open to students with credit for Math. 141. The basic number systems, decomposition of integers, modular systems, groups, rings, domains, fields, polynomial rings, matrices, vector spaces, linear transformations.

138. *Modern Geometry for Teachers.* I. 3 hr. PR: Math. 16 or consent. For prospective high school mathematics teachers. Foundations of geometry. Special topics from Euclidean, projective, and non-Euclidean geometries.

141. *Introduction to Algebraic Structures.* I. 3 hr. PR: Math. 163 or consent. A study of groups, rings, and fields together with their substructures, quotients and products, morphisms; the fundamental homomorphism theorems.

143. *Introduction to Linear Algebra.* II. 3 hr. PR: Math. 17 or 51. Introduction to vector spaces as an algebraic system. Emphasis on axiomatic development and linear transformations. Examples from geometry and calculus.

160. *Tutoring Practicum.* I, II. 1-3 hr. PR: Consent of Department Chairman. For undergraduates assisting with teaching of the Department of Mathematics' PSI (self-paced) courses in mathematics. Credit earned may not be applied to the B.S. (A.B.) requirements for a mathematics major.

161. *Mathematical Logic I.* I. 3 hr. PR: Phil. 10 or Math. 15 or consent. Logic of statements, relations and identity; introduction to notions of consistency, completeness and decidability. *(Equiv. to Phil. 106.)*

163. *Introduction to the Concepts of Mathematics.* I, II. 3 hr. PR: Math. 16 or consent. Elementary logic, basic set theory, relations and functions, equivalence relations and decomposition of sets, order relations, cardinality. Emphasis on learning to prove theorems.

168. *History of Mathematics.* II. 3 hr. PR: Math. 15. Development of mathematics through calculus, with emphasis on mathematical theories and techniques of each period and their historical evolution.

181. *Topology.* II, S. 3 hr. PR: Math. 163 or consent. Introduction to metric and topological spaces. Topics include continuity, convergence, separation, compactness and connectedness.

213. *Partial Differential Equations.* II. 3 hr. PR: Math. 113 or consent. Introduces students in mathematics, engineering, and the sciences to methods of applied mathematics. First and second order equations, canonical forms, wave, heat and La-Place's equations, representation of solutions.

214. *Vector Analysis.* I, II. 3 hr. PR: Math. 18. Primarily for engineers and scientists. Vector algebra, differential operators, curvilinear coordinate systems, Stokes' and Gauss' theorems, applications, linear systems of equations, matrices, determinants, quadratic forms, eigenvalues and canonical forms, and numerical inversions. *(Course will not be offered in 1979-80.)*

215. *Applied Modern Algebra.* II. 3 hr. PR: Consent. Introduction to graph theory, Boolean algebras, monoids, finite-state and Turing machines with applications to computer design, algebraic coding theory and computer language, especially ALGOL. *(Course will not be offered in 1979-80.)*

217. *Applied Mathematical Analysis.* II. 3 hr. PR: Math. 18 or 51. The algebra and differential calculus of vectors, solutions of the partial differential equations of mathematical physics, application of functions of a complex variable.

219. *Seminar in Applied Mathematics.* I, II. 1-12 hr.

226. *Mathematical Statistics.* II. 3 hr. PR: Math. 16 or consent. Designed for mathematics teachers. Frequency distributions, averages, probability, populations, samples,

probability distributions, estimations, hypothesis testing. Although no previous knowledge of computer language is assumed, the computer will be used in this course.

231, 232. *Introduction to Mathematics for the Elementary Teacher.* I, II. 3 hr. per sem. PR: Math. 34 or consent. (Not open to students who have credit for Math. 131, 132.) For inservice elementary mathematics teachers. Systems of numeration; sets, relations, binary operations, the algebraic structure of various number systems; the notions of length, area, and volume; coordinate geometry.

239. *Elementary Number Theory.* II, S. 3 hr. PR: Math. 16 or 131 or consent. Divisibility, congruences, linear and quadratic diophantine equations, number theoretic functions, and applications of number theory to other areas of mathematics. *(Course will not be offered in 1979-80.)*

241. *Applied Linear Algebra.* I, II. 3 hr. PR: Math. 18 or 51. Matrix algebra with emphasis on algorithmic techniques and applications to physical models. Topics include solution of large systems of equations, orthogonal projections and least squares, and Eigenvalue problems.

251, 252. *Introduction to Real Analysis.* I, II. 3 hr. per sem. PR: Math. 163 or consent. A study of sequences, convergence, limits, continuity, definite integral, and derivative, differentials, functional dependence, multiple integrals, sequences and series of functions.

255. *Advanced Real Calculus.* S. 3 hr. PR: Math. 51 or consent. Limits, series, metric spaces, uniformity, integrals.

256. *Complex Variables.* II. 3 hr. PR: Math. 18 or 51. Complex numbers, functions of a complex variable; analytic functions; the logarithm and related functions; power series; Laurent series and residues; conformal mapping and applications.

261. *Mathematical Logic II.* II. 3 hr. PR: Phil. 106 or Math. 161 or consent. A more formal and rigorous approach to the material covered in Phil. 106; selected problems in the philosophy of mathematics and the philosophy of logic. *(Equiv. to Phil. 206.)*

269. *Advanced Topics in Mathematics.* I, II, S. 3-9 hr. PR: Consent. An independent but directed study program, the content of which is to be mutually agreed upon by the individual student and instructor.

271. *Projective Geometry.* II. 3 hr. PR: Math. 141, 241, or consent. Projective and affine spaces, transformation groups for planes. Introduction to axiomatic plane geometries.

291, 292. *Theory of Probability.* I, II. 3 hr. per sem. PR: Math. 18 or 51. Fundamental theorems. Development of density and distribution functions in the discrete and continuous cases. Classical problems and solutions. Moments, characteristics functions, limit theorems. Applications.

Philosophy

Faculty

Henry L. Ruf, Ph.D. (Emory U.), *Professor; Chairman.*
Michelle C. Beer, M.A. (Yeshiva U.) M.A. (U. Pitt.), *Instructor (part-time).*
Ralph W. Clark, Ph.D. (U. Colo.), *Associate Professor.*
John R. Cresswell, Ph.D. (Cornell U.), *Professor Emeritus.*
Gene A. D'Amour, Ph.D. (U. Minn.), *Associate Professor.*
Theodore M. Drange, Ph.D. (Cornell U.), *Professor.*
William S. Haymond, Ph.D. (St. Louis U.), *Professor.*
Virginia Klenk, Ph.D. (U. Pitt.), *Assistant Professor.*
Patricia S. Long, M.A. (WVU), *Instructor (part-time).*
Mark R. Wicclair, Ph.D. (Columbia U.), *Assistant Professor.*

Program

Phil. 1 through Phil. 91 are primarily designed for lower-division students as self-contained liberal arts humanities courses. In small lecture-open discussion classes the student is aided to develop skills in thinking and reasoning properly and in asking deeper and deeper questions about some of the most profound and challenging problems confronting man's intellect today. The courses provide an excellent way to break away from high school into the collegiate intellectual atmosphere.

The major in philosophy is designed for students who want to go on into law, theology, journalism, public administration, social work, or business, as well as for those students who want to do graduate work in philosophy. The major gains advanced skills in analysis and argumentation, a thorough knowledge of the philosophical foundations of western civilization, and an advanced awareness of the ethical implications of contemporary life. Often the philosophy major will carry a second major in an allied field.

Requirements for Philosophy Major

Hours. Majors in philosophy are required to take 30 hours in philosophy including 18 hours of upper-division work. In addition, all majors are required to take a coherent program of 12 hours of upper-division study in courses approved by the major's adviser in one or more areas outside of philosophy which are judged to be most relevant to the student's particular interest in philosophy.

Required Courses. Each major is required to earn at least a C in each of the following courses: Phil. 1 or 10, 20, 21, 108, 171. Majors planning to do graduate work in philosophy are strongly urged to take Phil. 106.

Courses of Instruction in Philosophy (Phil.)

Lower Division

1. *Introduction to Critical Reasoning.* I, II, S. For students who want to improve their ability to recognize fallacious patterns of reasoning in ordinary discourse and to construct acceptable deductive and inductive arguments. Formal proof techniques will be introduced only when absolutely essential.

3. *Introduction to Philosophy.* I, II, S. 3 hr. An introduction to the field of philosophy, examining at an elementary level typical problems, issues, areas and/or methods.

4. *Introduction to Ethics.* I, II, S. 3 hr. An elementary examination of such issues as the way we ought to live, the nature of the best life, the just society and our moral responsibilities. Such major philosophers as Plato, Aristotle, Aquinas, Kant, and Mill will be studied.

5. *Logic for Debate.* I, II, S. 3 hr. An elementary course aimed at teaching students to think on their feet by having them debate in class the current national collegiate debate topic.

10. *Introduction to Symbolic Logic.* I, II, S. 3 hr. An introduction to modern symbolic logic (basically, propositional logic and the predicate calculus) for students who want to acquire the skill to represent symbolically the form of deductive arguments and to test formally for validity.

11. *Symbolic Logic II.* I, II, S. 3 hr. PR: Phil. 10. A continuation of Phil. 10, but branching into applications, analogues and alternative systems of logic. Topics include relational predicate logic, identity, definite descriptions; Boolean algebras; switching circuits; modal, many-valued and other alternative logics; philosophical applications. *(Equiv. to Math. 11.)*

13. *Current Moral Problems.* I, II. 3 hr. An elementary, philosophical examination of moral issues arising in such areas of current concern as paternalism, abortion, euthanasia, contractual obligations, due process, civil rights, war, economic justice, punishment, and civil disobedience.

15. *Introduction to Aesthetics.* I or II. 3 hr. An elementary examination of philosophical problems associated with the nature of beauty, the nature of the arts, and the justification of aesthetic evaluation.

20. *History of Ancient Philosophy.* I. 3 hr. An introduction to the major philosophies of the Western world from pre-Socrates to Plotinus.

21. *History of Modern Philosophy.* II. 3 hr. An introduction to the major philosophies of the Western world from Descartes to Kant.

91. *Special Topics.* I or II, S. 3 hr. (May not be repeated for credit.) An elementary examination of a philosophical issue, such as skepticism, freedom, alternative philosophies of life, minds and machines, God and immortality or the nature of man. Topics will vary.

Upper Division

103. *Topics in Medieval Philosophy.* I or II. 3 hr. PR: 3 hr. in philosophy or history major or consent. Study of selected topics in the major philosophies of the Western world from Augustine to William of Occam. *(Course will not be offered in 1979-80.)*

105. *History of Recent Philosophy.* I or II. 3 hr. PR: 3 hr. in philosophy or consent. A critical study of the major Western philosophers and philosophic movements in the nineteenth and early twentieth centuries including post-Kantian idealism, Marxism, Schopenhauer, existentialism, pragmatism, positivism, and neo-realism.

106. *Mathematical Logic I.* I. 3 hr. PR: Phil. 10 or Math. 15 or consent. The logic of statements, relations, and identity; introduction to the notions of consistency, completeness, and decidability. *(Equiv. to Math. 161.)*

108. *Ethical Theory.* I or II. 3 hr. PR: 3 hr. in philosophy or consent. A critical study of the meaning of moral concepts, the problems of rules of moral reasoning, criteria of moral truth, and the nature of moral rights, duties and obligations.

111. *American Philosophy.* I or II. 3 hr. PR: 3 hr. in philosophy or history or English major or consent. A study of the ideas and movements in American philosophical thought from Colonial times to the early twentieth century, including such topics as the American enlightenment, transcendentalism, social Darwinism, idealism, and pragmatism.

113. *Russian Philosophy.* I or II. 3 hr. PR: 3 hr. in philosophy or Russian concentrate or consent. A critical, historical study of Russian philosophy from the time of the eighteenth century Russian Socrates (Skovoroda) down to the time of the Russian Marxists (Plekhanov, Boganov, Lenin, and Axelrod). *(Course will not be offered in 1979-80.)*

121. *Existentialism.* I or II. 3 hr. PR: 3 hr. in philosophy or literature course in existentialism or consent. Survey of the major existentialist thinkers.

122. *Philosophies of Asia.* I or II. 3 hr. PR: 3 hr. in philosophy or consent. A critical, historical examination of the writings of the classic philosophers of India and China.

123. *Philosophy of Religion.* I or II. 3 hr. PR: 3 hr. in philosophy or religious studies concentrate or consent. The nature of religious faith, the nature and existence of God, and the grounds of religious conviction.

150. *Social and Political Philosophy.* I or II. 3 hr. PR: 3 hr. in philosophy or political science major or consent. Application of moral concepts to questions concerning the individual and the state.

158. *Philosophy of Science.* I or II. 3 hr. PR: 3 hr. in philosophy or science major or consent. Philosophical problems associated with the concepts and methodology of science.

159. *Philosophy of the Social Sciences.* I or II. 3 hr. PR: 3 hr. in philosophy or major in one of the social sciences or consent. Philosophical problems associated with the concepts and methodology of the social sciences.

166. *Metaphysics.* I or II. 3 hr. PR: Phil. 1, 3, or consent. Traditional problems associated with reality and experience, universals and particulars, causality, space and time, matter and mind, and the nature of the self.

171. *Theory of Knowledge.* I or II. 3 hr. PR: Phil. 1, 10 or 106 or consent. A critical analysis of the concept of knowledge and an examination of various forms of philosophical skepticism (skepticism about perception, memory, introspection, induction).

187. *Philosophy of Mind.* I or II. 3 hr. PR: Phil. 3, 21, or psychology major or consent. The nature of mind and its relation to the body. Other minds. Analysis of mental concepts.

190. *Teaching Practicum.* I, II. 3 hr.

195. *Field Experience (Debate).* I, II. 3 hr.

253. *Philosophy of Mathematics.* I or II. 3 hr. PR: Phil. 106 or consent. Contemporary viewpoints in the foundations of mathematics. *(Course will not be offered in 1979-80.)*

272. *Philosophy of Law.* I or II. 3 hr. PR: 6 hr. in philosophy or law or pre-law student or consent. A philosophical, metatheoretical study of legal theorizing, a metaphysical investigation of the presuppositions of legal claims and an application of philosophical ethics to legal practices, concentrating on recent studies by philosophical analysts.

283. *Philosophy of History.* I or II. 3 hr. PR: 6 hr. in philosophy or history major or consent. Theoretical problems such as the nature of historical explanation, relativism, and the status of speculative principles of history. *(Course will not be offered in 1979-80.)*

285. *Philosophy of Language.* I or II. 3 hr. PR: 6 hr. in philosophy or linguistic or language major or consent. Philosophical problems concerning the nature of meaning and language.

290. *Directed Studies.* I, II, S. 1-6 hr. (May be repeated for credit.) PR: Instructor's written consent. Individually supervised reading, research, and projects.

292. *Advanced Topics in Philosophy.* I or II. 3 hr. PR: 6 hr. in philosophy or consent. Advanced philosophical investigation of selected problems and issues. Topics will vary.

Physical Science

Fred M. Goldberg, Ph.D. (U. Mich.), *Coordinator of Physical Science Program and Associate Professor of Physics.*

The main objective of the introductory general course in physical science is to present to those students not majoring in science a meaningful view of the methods and accomplishments of science. The subject-matter content covered in lectures includes topics from physics, chemistry, astronomy, geology, and meteorology.

In the laboratory, students take part in a variety of inquiry skills as they attempt to provide answers to questions and to interpret data collected through experimentation and observation. Students develop the kinds of attitudes and intellectual skills necessary for self-instruction. The development of these skills

and the formation of positive attitudes towards science are considered to be as important as the subject-matter content.

Students who have successfully completed as much as 8 hours of chemistry or physics or geology can not take P. Sci. 1 and 2 for credit. Three hours of lecture and one 2-hr. laboratory period each week.

Courses of Instruction in Physical Science (P. Sci.)

Lower Division

1, 2. *Introductory General Course.* I, II. 4 hr. P. Sci. 1 is not a prerequisite to P. Sci. 2 although the sequence P. Sci. 1, 2 best meets the objectives of the course. 3 hr. lect., 2 hr. lab.

Physics

Faculty

William E. Vehse, Ph.D. (Carnegie-Mellon U.), *Chairman and Professor.*
Atam P. Arya, Ph.D. (Penn. St. U.), *Professor.*
Bernard R. Cooper, Ph.D. (U. Cal.), *Claude Worthington Benedum Professor of Physics.*
Stanley Farr, M.S. (WVU), *Associate Professor Emeritus.*
Martin V. Ferer, Ph.D. (U. Ill.), *Associate Professor.*
Fred M. Goldberg, Ph.D. (U. Mich.), *Associate Professor.*
Oleg Jefimenko, Ph.D. (U. Ore.), *Professor.*
Harry M. Kriz, Ph.D. (Brown U.), *Adjunct Assistant Professor.*
Arnold D. Levine, Ph.D. (Columbia U.), *Professor.*
John E. Littleton, Ph.D. (U. Rochester), *Assistant Professor.*
Milton E. McDonnell, Ph.D. (U. Del.), *Assistant Professor.*
Pedro A. Montano, D.Sc. (Technion), *Associate Professor.*
Arthur S. Pavlovic, Ph.D. (Penn. St. U.), *Professor.*
Carl A. Rotter, Ph.D. (Case Tech.), *Associate Professor.*
Mohindar S. Seehra, Ph.D. (U. Rochester), *Professor.*
Charles D. Thomas, Ph.D. (U. Chicago), *Professor Emeritus.*
Richard P. Treat, Ph.D. (U. Cal.), *Associate Professor.*
Douglas B. Williamson, Ed.D. (Columbia U.), *Associate Professor Emeritus.*

Programs

The programs and courses offered in physics are designed to lay a foundation for professional training of physicists, and to meet the needs of students majoring in areas where a background in physics is desirable. The department also offers courses of interest and value to a broad range of students in areas of general physics, education, physical science, photography, astronomy, meteorology, and the fine arts.

Major in Physics — B.S.

The degree of Bachelor of Science is intended for students who want to qualify for professional positions in industry, education, medicine, and government, as well as for those who plan to do graduate work in physics or related areas; 136 hours are required subject to the general exclusions for all degrees. A cumulative average of 2.0 for all physics courses is required.

Required Courses

Phys. 5, 11, 12, 124, 231, 233, 234, 241, 251, 283, electives (3 hr.); Math. 15, 16, 17, 18 or 51, 113; Electives (3 hr.); Science (8 hr.). Departmental advising is available to assist in setting up a program for each student.

Recommended Electives

Designed to meet the needs of the individual student. Chosen to meet College of Arts and Sciences requirements.

Honors Program

Qualified students with a cumulative grade-point average of at least 3.0 in physics courses may obtain a B.S. in Physics with honors by carrying out a physics-related project in addition to the required courses. The project results in the form of a written report must be approved by a committee composed of three faculty members chosen by the student, at least two of whom — including the project director — are from the Department of Physics.

The undergraduate adviser serves as the department director for the Honors Program.

Students should register for at least 2 hours of credit in the honors section of Phys. 201.

Courses of Instruction in Physics (Phys.)

Lower Division

1. *Introductory Physics.* I, II. 4 hr. PR: Plane geometry and algebra. The fundamental philosophy and principles of physics are applied to studies of mechanics, sound, heat, and thermodynamics through demonstrations, problems, and experiments.
2. *Introductory Physics.* I, II. 4 hr. PR: Phys. 1. The fundamental philosophy and principles of physics are applied to studies of electricity, magnetism, optics, light, and atomic and nuclear physics through demonstrations, problems, and experiments.
5. *Topics in Physics.* I. 3 hr. PR: Pre-Calculus. (Required for physics students; open to other science majors and education majors with a science specialty.) Topics of current interest in physics. Development of concepts and skills useful in further study in science.
7. *Physics of Music.* I. 3 hr. (For students of the liberal and fine arts as well as science and engineering majors.) The physical and psychophysical principles underlying the nature, production, transmission, reception, and reproduction of sound. *(No science or music prerequisites.)*
8. *Light, Vision, and Color.* II. 3 hr. (For students in liberal and fine arts.) Descriptive course emphasizing the basic principles of light with applications to color vision, and optical phenomena occurring in everyday environment and technology.
11. *General Physics.* I, II. 4 hr. PR: Math. 15. (Not open to students who have credit for Phys. 1.) Survey of classical mechanics, thermodynamics, and waves.
12. *General Physics.* I, II. 4 hr. PR: Phys. 11. (Not open to students who have credit for Phys. 2.) Survey of electricity, magnetism, and optics.

Upper Division

116. *Photography.* I, II. 3 hr. PR: 1 year college physics, 1 year college chemistry. Physics and chemistry of photography with practical application.
117. *Descriptive Meteorology.* I. 3 hr. PR: 1 year college physics or physical science. The atmosphere and its weather. Reading and analysis of weather maps. Weather observations. Special topics of current or particular interest.

124. *Elementary Modern Physics.* II. 4 hr. PR: Phys. 12. Topics of modern physics of interest to science majors and engineers: atomic and molecular structure and spectra, solid state and nuclear physics, relativity, and elementary particles.

201. *Special Topics.* I, II. 1-6 hr. per sem. (May be repeated to a maximum of 24 hr.) Study of topics of current interest in physics.

213. *Electronics.* I, II. 3 hr. PR: Phys. 12. Theory, experiments and application of electronics; with laboratory.

225. *Atomic Physics.* I, II. 3 hr. PR: Phys. 124 or equiv. Relativistic mechanics, atomic structure, and spectra.

231, 232. *Theoretical Mechanics.* I, II. 3 hr. per sem. PR: Phys. 11, 12 or equiv. Scalar, vector, and tensor fields; curvilinear coordinate systems. Kinematics and dynamics of particles, systems of particles and rigid bodies. Lagrange and Hamiltonian formulation. Relativistic motion.

233, 234. *Electricity, Magnetism, and Radiation Optics.* I, II. 3 hr. per sem. PR: Phys. 11, 12 or equiv. Electrostatics, magnetostatics, introduction to electrodynamics, and applications to optics.

241. *Advanced Physics Laboratory.* I, II. 1-2 hr. per sem. Experiments in physics designed to implement theory courses, give experience in data taking and instrumentation, and learn methods of data evaluation and error analysis.

247, 248. *Physics Seminar.* I, II. (No Credit.) (Suggested for junior, senior, and graduate physics majors.) These lectures acquaint students with topics of current interest in physics.

251. *Introductory Quantum Mechanics.* I. 3 hr. PR: Phys. 124. Fundamental principles of quantum mechanics; state functions in position and momentum space, operators, Schrödinger's equation, applications to one-dimensional problems, approximation methods, the hydrogen atom, angular momentum and spin.

263. *Nuclear Physics.* I, II. 3 hr. PR: Phys. 11, 12 or equiv.; Phys. 124. Study of characteristic properties of nuclei and their structure as inferred from nuclear decays and reactions, leading to a knowledge of nuclear forces and models.

271. *Solid State Physics.* II. 3 hr. PR: Phys. 124 or equiv. Properties of crystalline solids: includes crystal structure, binding, lattice vibrations and an investigation of thermal, electrical, magnetic, and optical phenomena based on energy band theory.

283. *Thermodynamics.* II. 3 hr. PR: Phys. 11, 12 or equiv. Introduction to the statistical foundations of thermodynamics. Application of the fundamental laws of thermodynamics to physical and chemical systems.

284. *Kinetic Theory.* II. 3 hr. PR: Calculus, Phys. 11, 12 or equiv. The concepts of probability which lead to the derivation of the Boltzman, Fermi-Dirac, and Bose-Einstein statistics. Application of these statistics to physical and chemical systems. *(Course will not be offered in 1979-80.)*

301. *Special Topics.* I, II. 1-6 hr. per sem. (May be repeated to a maximum of 24 hr.) PR: Consent. (Primarily for graduate students.) Specialized topics of current interest in physics.

313. *Introductory Electronics.* S. 3 hr. PR: 1 year college physics. (Primarily for education majors.) Principles and applications of electrical components and circuits, including solid state electronics.

321. *Optics.* I, II. 3 hr. PR: Phys. 11, 12 or equiv. A basic course in physical optics covering radiation theory, diffraction, interference, polychromatic waves, scattering, polarization, double refraction, and selected topics in quantum optics. *(Course will not be offered in 1979-80.)*

331. *Advanced Classical Mechanics.* I. 3 hr. PR: Phys. 231, 232, and differential equations. Lagrange and Hamilton form of equations of motion, rigid bodies, small and

nonlinear oscillations. Transformation theory, relativistic dynamics, and systems with an infinite number of degrees of freedom.

333. *Advanced Electricity and Magnetism.* II. 3 hr. PR: Phys. 233, 234, and differential equations. Electrostatic and magnetostatic boundary value problems. Maxwell's equations for time varying fields. Green's functions and integral representations; applications to radiation, diffraction, wave guides, plasma physics, and relativistic motion of charged particles.

351, 352. *Quantum Mechanics.* I, II. 3 hr. per sem. PR: Phys. 225, 251. Covers a wide range of topics of current interest at a level such that a student should be able to read basic research papers in many fields upon completion. Topics covered include: approximation methods, representation theory, angular momentum relativistic quantum mechanics, time dependent perturbation theory, identical particles, scattering, molecules, solids, magnetism, and second quantization of bosons and fermions.

354. *Introduction to Modern Physics.* S. 3 hr. PR: One year introductory college physics. (Primarily for education majors; not open to physics majors.) Elementary study of atomic and molecular structures and spectra, solid state and nuclear physics, relativity and elementary particles.

355, 356. *Workshop for Physics Teachers.* SI, SII. 3 hr. per sem. PR: 1 year college physics, 1 year college mathematics. (Primarily for education majors; not open to physics majors.) Techniques of apparatus construction and demonstration.

357. *Photography.* SI. 3 hr. PR: 1 year college physics or equiv. (Primarily for education majors; not open to physics majors.) The physics and chemistry of photography with practical experience.

358. *Light.* SII. 3 hr. PR: 1 year college physics or equiv. (Primarily for education majors; not open to physics majors.) A demonstration course designed to illustrate the basic concepts covering light and optics.

383. *Statistical Mechanics.* II. 3 hr. PR: Phys. 283, 351, 352. Classical statistics; Boltzman, Fermi-Dirac and Bose-Einstein statistics, theory of fluctuations and applications to physical systems.

387. *Mathematics for Physicists and Engineers.* I. 3 hr. PR: Calculus, differential equations, Phys. 11, 12 or equiv. Complex variables: series, contour integration and conformal mapping; ordinary differential equations; Fourier Series; Laplace transforms, Fourier transforms; special functions; Bessel functions and Legendre, Hermite, and Laguerre polynomials; introduction to partial differential equations; Poisson's equation, Wave equation, and diffusion equation.

388. *Mathematics for Physicists and Engineers.* II. 3 hr. PR: Phys. 387 or equiv. Infinite dimensional linear vector spaces; series and Green's function methods of solution of partial differential equations; variational methods. Applications in electricity and magnetism, fluid mechanics, diffusion heat flow, propagation, and scattering phenomena.

Courses of Instruction in Astronomy (Astro.)

Upper Division

106. *Descriptive Astronomy.* I, II. 3 hr. The celestial sphere, star time, solar time, Kepler's laws, H-R diagram and modern developments. No mathematics used; only simple geometrical arguments employed.

216. *Astronomy for Teachers.* S. 3 hr. PR: Consent. Basic concepts and methods in astronomy and how to teach them using the celestial sphere and geometrical tools. Observational work at night. The use of a telescope and camera.

255. *Intermediate Astronomy.* II. 3 hr. PR: Math. 16 or consent. Measurement of the universe; trigonometric parallax, statistical parallax, moving clusters, cluster H-R

diagrams, masses of various binary systems, Kepler's Laws, and the three-body problem.

Political Science

Faculty

Orrin B. Conaway, Jr., Ph.D. (Syracuse U.), *Chairman; Claude Worthington Benedum Professor of Political Science.*
David A. Bingham, Ph.D. (U. Iowa), *Director, Bureau for Government Research; Professor.*
Robert E. DiClerico, Ph.D. (Ind. U.), *Associate Professor.*
D. Lyn Dotson, J.D., (WVU), *Adjunct Assistant Professor.*
Carl M. Frasure, Ph.D. (Ohio St. U.), *Professor Emeritus.*
Royal C. Gilkey, Ph.D. (U. Minn.), *Professor.*
Dennis R. Goldenson, Ph.D. (U. Minn.), *Adjunct Assistant Professor.*
Douglas I. Grube, Ph.D. (U. Pitt.), *Adjunct Assistant Professor.*
Allan S. Hammock, Ph.D. (U. Va.), *Associate Chairman; Associate Professor.*
Thomas G. Ingersoll, Ph.D. (Penn. St. U.), *Assistant Professor.*
John A. Jacobsohn, Ph.D. (U. Md.), *Assistant Professor.*
Hong N. Kim, Ph.D. (Georgetown U.), *Professor.*
James M. Lutz, Ph.D. (U. Tex.), *Assistant Professor.*
H. Peter Marshall, M.S. (Mich. St. U.), *Assistant Professor.*
Donald C. Menzel, Jr., Ph.D. (Penn. St. U.), *Associate Professor.*
Herman Mertins, Jr., Ph.D. (Syracuse U.), *Adjunct Professor.*
Philip L. Miller, Ph.D. (Ohio St. U.), *Assistant Professor.*
Sophia L. Peterson, Ph.D. (UCLA), *Associate Professor.*
Gerald Pops, Ph.D. (Syracuse U.), *Adjunct Associate Professor.*
George W. Rice, Ph.D. (Ohio St. U.), *Professor.*
Harold J. Shamberger, M.P.A. (Wayne St. U.), *Assistant Professor.*
Irvin Stewart, Ph.D. (Columbia U.), *President Emeritus of West Virginia University.*
David G. Temple Ph.D. (U. Va.), *Professor.*
James B. Whisker, Ph.D. (U. Md.), *Associate Professor.*
Herbert G. Wilcox, Ph.D. (NYU), *Professor.*
David G. Williams, Ph.D. (SUNY, Albany), *Adjunct Associate Professor.*
John R. Williams, Ph.D. (Duke U.), *Professor.*
Harvey Wolf, D.P.A. (U. Sou. Calif.), *Adjunct Assistant Professor.*
Rodger D. Yeager, Ph.D. (Syracuse U.), *Associate Professor.*

Program

The political science curriculum provides a systematized course of study of the nature and operation of government and politics in its many and varied aspects. These include: principles, organization, and structure of political institutions, both domestic and foreign; the processes and functions of government; interrelationships between political institutions on various levels of government and analysis of public problems falling within the range of government. Course offerings in the Department of Political Science provide a basic general knowledge of the field of politics and administration as well as more extensive and intensive training in the specialized areas of political science; particularly in the senior and graduate levels.

There are five primary departmental objectives for which special tracks or programs of courses have been prepared:

1. To develop an understanding of the nature and role of government in modern society, thus contributing to a general, liberal education. The *General Political Science* track has been devised to fulfill this objective.

2. To impart a basic knowledge and understanding of the techniques and processes of government and administration to those persons interested either in a career in the public service or in graduate public administration training. The *Public Affairs* track has been devised to fulfill this objective.

3. To provide pre-professional training for students preparing to engage in graduate political science study. The *Graduate Political Science* track is devised to fulfill this objective.

4. To provide pre-professional training for students preparing to enter the legal profession. The *Pre-Law* track is devised to fulfill this objective.

5. To provide advanced and specialized instruction, through the Ph.D. degree, for persons who wish to enter teaching or research in political science. (See the WVU *Graduate School Catalog* for the graduate programs.)

Major in Political Science

Requirements

Some departmental requirements apply to all political science majors. Other requirements vary with the track that a student selects.

The departmental requirements which apply to *all* political science majors are as follows:

1. One upper-division course must be taken from each of the five subfields: American Government and Politics (numbered in the 10/20/30s), Public Administration (40s), Comparative Politics (50s), International Relations (60s), and Political Theory (70s).

2. Thirty upper-division hours in political science.

3. Twelve upper-division hours in a minor field (or an interdepartmental minor which must be approved by a departmental committee). For this purpose, Acctg. 51-52, Com. S. 1-2, and Engr. 1-2 may be counted as upper division.

4. Econ. 51-52 or Econ. 54-55.

5. Upper-division study of approaches to political science.

Courses which are equivalent to each other may not be taken for double credit, such as Stat. 101 and Econ. 125.

Organization of Political Science Courses

Political science is divided into five fields:
American Government and Politics. (Courses numbered in the 10/20/30s.)
Public Administration. (Courses numbered in the 40s.)
Comparative Politics. (Courses numbered in the 50s.)
International Relations. (Courses numbered in the 60s.)
Political Theory. (Courses numbered in the 70s.)

Tracks

Special tracks of required and recommended courses have been developed for students with different goals: General Political Science, Graduate Political Science, Public Affairs (for students interested in government service or graduate public administration), and Pre-Law. The following presents these courses.

General Political Science — Political science courses* recommended: No more than three upper-division courses should be taken in any one sub-field. Minor courses* required: 12 upper-division hours in one of the following — business, economics, English, foreign languages, geography, history, journalism, mathematics, philosophy, psychology, sociology and anthropology, social

work, speech communication, and statistics and/or computer science. Tool skills recommended: Pol. S. 200.

Graduate Political Science — Political science course* required: Pol. S. 200. Minor courses* required: 12 upper-division hours in one of the following — economics, geography, history, philosophy, psychology, sociology and anthropology, statistics and/or computer science. Tool skills required: Stat. 101 (or Econ. 125); recommended: Com. S. 1 and 2. Students whose area of interest makes knowledge of a language desirable should continue with a foreign language beyond the University requirements.

Public Affairs — Political science courses* required: two upper-division courses in public administration; two upper-division courses in American government and politics (focusing on state and local government and public policy). Minor courses* required: 12 upper-division hours in one of the following — accounting, business management, civil engineering, economics, English, geography, history, humanities, industrial engineering, journalism, philosophy, psychology, social work, sociology and anthropology, speech communication, statistics and/or computer science. Tool skills required: 6 hours from the following — Acctg. 51, 52; Com. S. 1; Stat. 101 or Econ. 125; Stat. 201.

Pre-Law — Political science courses* recommended: Pol. S. 275 and breadth of course selection in political science and other social sciences is recommended. Minor courses* required — 12 upper-division hours in one of the following — business, economics, English, foreign languages, geography, history, journalism, mathematics, philosophy, psychology, social work, sociology and anthropology, speech communication, statistics and/or computer science. Tool skills required: Acctg. 51, 52; recommended: 6 hours from following — Com. S. 1; Stat. 101 (or Econ. 125); Stat. 201.

Honors Program

The Department of Political Science, in cooperation with the Honors Program of the College of Arts and Sciences, offers courses which are open exclusively to Honors students. These courses are listed in the University's *Schedule of Courses* each semester. Students who meet the standards of the Honors Program may enroll in these courses.

In addition, the Department of Political Science offers honors courses for those who wish to gain departmental honors status. In order to achieve honors in political science a student must: (a) complete at least 15 hours in upper-division political science courses; (b) have a minimum grade-point average of 3.3; and (c) take at least 6 hours in upper-division honors sections of political science courses. Students interested in the Political Science Honors Program should contact the Director of Undergraduate Studies in the Department of Political Science.

Courses of Instruction in Political Science (Pol. S.)

Lower Division

1. *Introduction to Political Science.* I, II, S. 3 hr. Introduction to government. Origins, forms, and functions of the state; organization and forms of government; and the relationships of groups and individuals to the state.

2. *The American Federal System.* I, II. 3 hr. General survey of American national government and politics.

*Political Science and minor courses are selected from a list of approved courses provided by the adviser.

100. *Introduction to Political Analysis.* I, II. 3 hr. Application of a range of approaches to the study of politics in each subfield of political science. Each approach is explored for its own presuppositions, direction of bias, and unique questions it poses for the researcher.

120. *State and Local Government.* I, II. 3 hr. The legal basis, structure, politics and operation of state and local governments, their relations with each other, and their place in the federal system.

121. *Introduction to Urban Planning.* I, II. 3 hr. Structure of urban communities; history, processes, and objectives of planning; trends in planning and urban development.

130. *Political Parties and Electoral Processes.* I, II. 3 hr. Nature of political parties. Public regulation of parties and electoral processes. A close examination of suffrage, nominating devices, campaign procedures, and the conduct of elections.

135. *Introduction to Policy Analysis.* I, II. 3 hr. Examination of the causes and consequences of public policies.

140. *Introduction to Public Administration.* I, II. 3 hr. The development, organization, procedures, processes, and human relation factors of governmental administration in American democracy.

150. *Contemporary European Governments.* I, II. 3 hr. Comparative analysis of constitutions, political structures, and functions, with major emphasis upon the United Kingdom, France, Russia and West Germany.

160. *International Relations.* I, II. 3 hr. Contemporary world politics. Background to make present-day international affairs more understandable.

188. *Honors Seminar.* I, II. 3 hr.

189. *Selected Topics (Honors).* I, II. 3 hr.

191. *Special Topics.* I, II, S. 1-4 hr. PR: Consent. (May be repeated for a maximum of 12 hours.)

195. *Field Experience.* I, II, S. 1-18 hr. PR: Consent. Course for those who wish to work with faculty and field supervisors to design field experience with planned learning objectives and credit goals. (Total credit applicable toward any Arts and Sciences degree may not exceed the maximum of 18 hours.)

196. *Seminar.* I, II, S. 1-6 hr.

200. *Introduction to Political Behavior.* I, II. 3 hr. PR: Upper-division standing. Course stresses the understanding of methods, theories, and substantive interests identified with behavioral approach to the study of politics. Descriptive statistics and the use of the Statistical Package for the Social Sciences are included.

210. *The American Presidency.* I, II. 3 hr. Institutional, behavioral, and societal forces which have given rise to the modern presidency; factors which enhance and constrain the exercise of the presidential power over those constituencies with which he must interact; the nature and consequences of the presidential decision-making process; desirability and/or feasibility of reforming the presidency.

211. *Problems of American National Government.* I, II. 3 hr. An examination of selected problems in American government and politics.

213. *American Constitutional Law.* I. 3 hr. PR: Pol. S. 2 or consent. (Primarily for juniors and seniors as well as graduate students.) Basic principles of American constitutional law as developed through court interpretations based on precedents rooted in an English-derived colonial heritage. Special emphasis on the division and separation of powers, the implementation of rights by court decisions expanding their effect through "incorporation," and the strategic significance of judicial review. Major constitutional controversies, as treated by courts and judges, are examined in the light of the facts and from the standpoint of theory in order to reach

tenable conclusions as to the role of the judiciary in America. Case method of instruction.

214. *Civil Rights and Liberties in the United States.* II. 3 hr. PR: Pol. S. 213 or consent. The scope and meaning of civil liberty guarantees in the United States Constitution, as illustrated by cases involving original constitutional provisions, the Bill of Rights, and Civil War amendments with special attention to the rule of law; free speech, press, religion, assembly, and petition; personal security; racial discrimination; and the labor problem.

215. *American Constitutional Development. I.* I. 3 hr. PR: Pol. S. 2 or consent. American constitutional development, with special emphasis on origins of constitutionalism here; liberty vs. government; mixed government; separation of powers; problem of federalism and Philadelphia Convention of 1781; Marshall court and establishment of judicial review; Federalist vs. States Rights construction of Constitution; Jacksonian influences; Taney Court prelude to Civil War, secession, and conflict, heralding constitutional change.

216. *American Constitutional Development II.* II. 3 hr. PR: Pol. S. 2, 215, or consent. American constitutional development, with special attention to reconstruction, Supreme Court, and Fourteenth Amendment; laissez-faire and commerce clause; stirrings of reform toward a constitutional revolution under the New Deal; changing federal-state relationships; impact of war on constitutional interpretation; expanding role of the president in domestic matters and foreign relations; Warren Court, the Burger Court dominated by Nixon-Ford appointed judges.

221. *West Virginia Government and Administration.* I, II. 3 hr. Organization and operation of the state government of West Virginia.

225. *Municipal Government.* I. 3 hr. Legal basis, structure, processes and politics of urban governments and cooperative-conflict relations with other governmental units.

226. *Problems of State and Local Government.* I, II. 3 hr. PR: Pol. S. 120 or equiv. Change processes in state and local systems in the context of federalism.

232. *Public Opinion and Propaganda.* I, II. 3 hr. The formation, measurement, and impact of public opinion in the American and cross-national contexts.

233. *Current Political Issues.* I. 3 hr.

234. *The Legislative Process.* II. 3 hr. Structure and organization of legislative bodies. Powers of legislature. Detailed study of law-making procedures. Influences of outside forces.

236. *Energy/Environmental Policies and Politics.* II. 3 hr. PR: Pol. S. 2, 120, 135, or consent. Focus on U.S. policies, programs, and politics, in the energy and environmental areas.

240. *Public Administration and Social Change.* I, II. 3 hr. PR: Pol. S. 140. The study of government and administrative organization in their relationships to the sources of change — social, cultural, economic, technological, and environmental — in American society.

244. *Administrative Law and Regulation.* II. 3 hr. PR: Pol. S. 140 or consent. The law of public administration, primarily by case method, covering administrative powers and limitations, procedure in administrative adjudication and rule-making, discretion, ultra vires as check on administrators, notice and hearing, administrative penalties, judicial control, and administrative liability.

246. *Comparative Public Administration.* II. 3 hr. Theory and practice of public administration in diverse cultures and national political systems.

250. *Government of Japan.* II. 3 hr. Survey of political institutions and governmental process of Japan with special emphasis on the analysis of political problems in the post-war period.

251. *Government of Soviet Union and Eastern Europe.* II. 3 hr. PR: Pol. S. 1 or 2. Survey of the political non-democratic governments of the Soviet Union and its Eastern satellites, with special reference to the guiding role and development of Marxism-Leninism.

252. *British Government and Politics.* II. 3 hr. Intensive study of British government with emphasis on internal and external policies, primarily during the twentieth century.

253. *Contemporary Governments of the Commonwealth.* II. 3 hr. Political relationships between members of Commonwealth. Comparative study of governments and politics of the dominions, with particular reference to Canada and Australia.

254. *Government of China.* I. 3 hr. Survey of political institutions and governmental process of Communist China with special emphasis on the analysis of political problems since 1949.

255. *Governments of Latin America.* I. 3 hr. Comparative study of the major nations of Latin America.

256. *Governments of the Middle East.* II. 3 hr. Governments and political forces of the Middle East.

258. *Politics of Africa.* II. 3 hr. Historical legacies and current political processes of tropical African countries.

261. *International Organization.* II. 3 hr. Agencies created since close of World War II. Some reference to the development of international law and United Nations.

263. *Public International Law.* I. 3 hr. Law governing relations among nations, including development of rules, means of enforcement, and conflicts between theory and practice.

264. *Conduct of American Foreign Relations.* I. 3 hr. Concepts about factors and influencing the formation and execution of United States foreign relations; analysis of past policies and current issue areas in relations with major developed and developing nations and international organizations.

266. *Soviet Foreign Policy.* II. 3 hr. Concepts about and factors influencing the formulation and execution of Soviet foreign relations; analysis of past policies and current issue areas in relations with major developed and developing nations and international organizations.

267. *Latin America in International Affairs.* II. 3 hr. Relations of Latin American states among themselves, with the United States, the United Nations, regional organizations, and non-western states. Analysis in depth of the Monroe Doctrine and its corollaries, and the inter-American system.

268. *Inter-State Conflict in International Affairs.* II. 3 hr. PR: Pol. S. 160 or consent. Conflict in inter-state relations. in particular armed conflict between nations. Attention to the role of force, impact of modern technology and nuclear weaponry, theoretical and research approaches to causes and nature of conflict, and different modes of conflict control and resolution.

269. *Far Eastern International Relations.* II. 3 hr. International relations of Far Eastern countries with emphasis on historic roots of recent conflicts, the competitive role of the United States and the Soviet Union, confrontation between the communist and anti-communist countries in the region, and the regional cooperation and security problems in the post-war period.

270. *History of Political Thought: Plato to Machiavelli.* I. 3 hr. Major political ideas from the Greeks to sixteenth century with special emphasis upon development of natural law and western conception of justice.

271. *History of Political Thought: Machiavelli to Bentham.* II. 3 hr. PR: Pol. S. 270 or consent. Political ideas which developed from the separation of faith and reason,

the culmination of this movement in rational integral liberalism, and the origins of modern conservatism as expounded by Edmund Burke.

272. *Recent and Contemporary Political Thought.* I. 3 hr. Examination of integral liberalism and the forces leading to the decline of liberalism and a critical analysis of the fascist and communist ideologies with their threat to the traditions of western civilization embodied in Christianity and conservatism.

273. *American Political Theory.* I, II. 3 hr. Major political ideas and their influence upon American society and government from seventeenth century to present.

275. *Foundations of Jurisprudence.* II. 3 hr. Inquiry into: (a) nature, end, and sanctions of law; its sources, forms, and modes of growth, as evidenced in typical legal systems; general juristic conceptions of rights, duties, and liabilities as well as persons, acts, and things; (b) main schools of jurisprudence — analytical, historical, philosophical, sociological, and that of legal realism; (c) economic interpretation of law and its relation to property and interest; (d) problem of legal rule versus discretion; (e) meaning of obligation, with special reference to contract; (f) stages in the development of legal institutions, forms and procedures (as exemplified in trials); (g) significant theories about law including the Marxian "aberration"; and (h) status of law in today's world.

279. *Analysis of Political Behavior.* II. 3 hr. This course examines political behavior in terms of recent behavioral theories emanating from a variety of disciplines.

299. *Special Topics.* I, II. 1-3 hr. PR: Instructor's written consent. Supervised reading, research, special projects, or field experience.

300. *Introduction to Political Science Methodology.* I. 3 hr. General structure of political science methodology with emphasis on constructing research hypotheses, data collection and analysis, scientific approach to political problem solving, interpretation of quantitative analysis, and research project.

310. *American Political Institutions.* I. 3 hr. (Intended primarily for graduate students.) A systematic and critical treatment of the major theoretical perspectives and research findings in the field of American politics.

335. *Theory of Public Policy Development.* II. 3 hr. PR: Pol. S. 135 or equiv. Review and assessment of current efforts to develop theories of public choice in the American political system. The role of the policy analyst is examined.

345. *Public Administration and Policy Development.* II. 3 hr. PR: Pol. S. 140 or consent. Decision-making and policy development in the administrative process by the case method.

350. *Proseminar in Comparative Politics.* I. 3 hr. PR: Graduate standing or consent. A survey of traditional, contemporary deductive, and contemporary inductive approaches to comparative politics, with particular attention to recent cross-national methodologies and research findings. *(Course will not be offered in 1979-80.)*

351. *Politics of Planned Development.* I. 3 hr. Political aspects of social, economic, and technological change, with special reference to the politics of development planning and administration.

352. *Leadership and Authority in Africa.* II. 3 hr. Traditional, colonial, and contemporary political leadership and authority patterns in Africa south of the Sahara. *(Course will not be offered in 1979-80.)*

353. *The Theory of Political Development.* II. 3 hr. PR: Graduate standing or consent. Contemporary theories of political stability and change in relation to social and economic processes occurring within newly independent countries and selected subnational regions. *(Course will not be offered in 1979-80.)*

360. *Proseminar in International Relations.* I. 3 hr. PR: Graduate student standing or consent. An entensive and systematic critical analysis of contemporary theory and

research representative of the major foci in international relations. *(Course will not be offered in 1979-80.)*

370. *Proseminar in Political Theory.* II. 3 hr. PR: Pol. S. 270, 271, or consent. A survey course designed for graduate students which covers the major trends within political theory. Perennial questions of political theory, such as property, liberty, state power, and the good political system. *(Course will not be offered in 1979-80.)*

Psychology

Faculty

Jon E. Krapfl, Ph.D. (U. Mo.), *Professor and Chairman.*
Edward C. Caldwell, Ph.D. (Syracuse U.), *Associate Professor.*
Edward J. Callahan, Ph.D. (U. Vt.), *Assistant Professor.*
James Capage, Ph.D. (Ohio U.), *Adjunct Assistant Professor.*
James F. Carruth, Ph.D. (U. Ill.), *Professor.*
David A. Clayman, Ph.D. (U. Vt.), *Adjunct Assistant Professor.*
Stanley H. Cohen, Ph.D. (Mich. St. U.), *Associate Professor.*
Philip E. Comer, Ph.D. (WVU), *Associate Professor.*
John D. Cone, Ph.D. (U. Wash.), *Associate Professor.*
Quin F. Curtis, Ph.D. (U. Mich.), *Professor Emeritus.*
Nancy Datan, Ph.D. (U. Chicago), *Associate Professor.*
Robert L. Decker, Ph.D. (Carnegie-Mellon U.), *Associate Professor.*
Barry A. Edelstein, Ph.D. (Memphis St. U.), *Associate Professor.*
Sharon Foster, Ph.D. (SUNY — Stony Brook), *Assistant Professor.*
William J. Fremouw, Ph.D. (U. Mass.), *Assistant Professor.*
Carilyn Z. Fuchs, Ph.D. (U. Pitt.), *Adjunct Assistant Professor.*
Marilyn I. Geller, Ph.D. (SUNY — Binghamton), *Assistant Professor.*
Sanford E. Geller, Ph.D. (SUNY — Binghamton), *Adjunct Assistant Professor.*
Irving J. Goodman, Ph.D. (U. Rochester), *Associate Professor.*
T. Patrick Griffin, Ph.D. (U. Ala.), *Lecturer.*
Donald F. Hake, Ph.D. (So. Ill. U.), *Professor.*
D. Dwight Harshbarger, Ph.D. (U. N.D.), *Adjunct Professor.*
Robert P. Hawkins, Ph.D. (U. Pitt.), *Professor.*
Barbara D. Ingersoll, Ph.D. (Penn. St. U.), *Adjunct Assistant Professor.*
Kennon A. Lattal, Ph.D. (U. Ala.), *Associate Professor and Acting Associate Chairman.*
Susan E. Mason, Ph.D. (Ga. Tech.), *Assistant Professor.*
Gerald L. Mayhew, Ph.D. (Ariz. St. U.), *Adjunct Assistant Professor.*
Kathleen A. McCluskey, Ph.D. (U. Kans.), *Assistant Professor.*
A. John McSweeny, Ph.D. (No. Ill. U.), *Assistant Professor.*
Robert W. Miller, Ph.D. (Ohio St. U.), *Professor.*
James C. Noah, Ph.D. (U. Mo.), *Assistant Professor.*
Joseph V. Panepinto, Ph.D. (WVU), *Adjunct Associate Professor.*
B. Kent Parker, Ph.D. (U. Utah), *Associate Professor.*
Eugene A. Quarrick, Ph.D. (Syracuse U.), *Associate Professor.*
Hayne W. Reese, Ph.D. (U. Iowa), *Centennial Professor.*
Richard J. Seime, Ph.D. (U. Minn.), *Adjunct Assistant Professor.*
James N. Shafer, Ph.D. (Ohio St. U.), *Professor.*
Trevor F. Stokes, Ph.D. (U. Kans.), *Assistant Professor.*
John L. Williams, Ph.D. (U. Mo.), *Visiting Associate Professor.*
Ralph R. Turner, Ph.D. (Syracuse U.), *Assistant Professor.*

Program

Courses in psychology are designed for one or more of the following ends: (1) as part of a liberal arts education principles, methods and theories are conveyed which are necessary for a better understanding of human and animal behavior; (2) basic preparation for students interested in graduate work leading to

a career in basic or applied psychology; (3) preparation for a career as a bachelor's level psychological assistant or technician, or as background for work in related social science fields.

The emphasis of preprofessional undergraduate training in psychology is placed on a broad liberal arts education. Excessive specialization in psychology is discouraged for students who intend to pursue training in psychology at the graduate level. Such students should rather seek a strong supporting background in mathematics and the natural and social sciences. A strong major, however, is recommended for students who do not intend to continue their education beyond the bachelor's degree.

Major in Psychology

Required Courses

Psych. 1, 2; Stat. 101; one course from each of the following groups of courses:

Group I: Psych. 223, 224, 225, 232.
Group II: Psych. 242, 243, 245.
Group III: Psych. 262, 264, 274, 281, 282.
Group IV: Psych. 251, 263, 279.

In addition, 12 hours of other upper-division psychology courses, excluding Psych. 190, 195, and 213.

Students who major in psychology should consider three options. Students who are primarily interested in the professional application of psychological principles to human problems should select additional courses from Groups III and IV. Students primarily interested in graduate training in psychology should consider taking Psych. 218 and additional courses which provide a broad theoretical coverage of modern psychology. Over-specialization through selection of courses in only one or two areas of psychology is *not* recommended for majors interested in graduate training. Students primarily interested in psychology as it applies to their personal and social development are encouraged to take the following courses: Psych. 141, 151, 164, and 170.

All psychology majors should consider upper-division courses which provide an opportunity for them to apply basic principles of psychology. Particularly recommended for this purpose are Psych. 190, 195, and 213. Students must obtain the instructor's consent before enrolling in these courses. Application forms are available in the department office.

Electives in the following areas are frequently taken by psychology majors: biology, mathematics, philosophy, political science, sociology and anthropology, statistics and computer science, child development and family relations, and social work.

Honors Program

Honors sections of Psych. 1 and 2 are offered, respectively, in the Fall and Spring semester. These courses are open to all students in the WVU Honors Program. Psychology majors with outstanding academic records may also apply for admission to the Honors Program of the Department of Psychology.

Courses of Instruction in Psychology (Psych.)

Lower Division

1. *Introduction to Psychology.* I, II, S. 3 hr. Survey of general psychology.

2. *Research Methods in Psychology.* I, II. 3 hr. PR: Psych. 1. Research methods used in experimental, developmental, clinical, and community-social psychology are studied in both the laboratory and the natural environment.

Upper Division

(Psych. 1, or its equivalent or graduate standing, is a prerequisite to all upper-division courses. A total of 9 hours of psychology or graduate standing is a prerequisite to all 200-level courses.)

101. *Leadership and Human Relations.* I, II, S. 3 hr. Leadership training, motivation and morale, human relations, safety, industry, and society.

141. *Introduction to Human Development.* I, II, S. 3 hr. Survey of human development across the life-span with an emphasis on change in physical, cognitive, and social-emotional processes. Applied problem solving using developmental information provides experience for service related professions such as social work, nursing, guidance and counseling.

151. *Introduction to Social Psychology.* I, II, S. 3 hr. Social factors which determine human behavior. Relationships of class, race, culture, social structure, and other group phenomena to individual behavior.

164. *Personal and Social Adjustment.* I, II, S. 3 hr. Applications of material from personality, abnormal, clinical, and social psychology to the problems of achieving positive personality change.

170. *Sex Roles and Behavior.* I, II, S. 3 hr. Relates sex-typed behavior to physiological, psychological, social, and cultural processes. Current social concerns such as rape and abortion legislation, child care, and expanded career options for both sexes are examined from a psychological perspective.

190. *Teaching Practicum.* I, II, S. 1-3 hr. PR: Consent. Individually supervised experience in teaching, tutoring, and/or classroom management projects. *(No more than 12 hours of Psych. 190 may be counted toward the 42 hours of psychology to which majors are limited.)*

191. *Special Topics in Psychology.* I or II, S. 1-3 hr. Contemporary topics in psychology considered at an intermediate level for both psychology majors and majors in other areas.

195. *Field Experience in Psychology.* I, II, S. 1-15 hr. PR: Consent. Individually supervised experience in the applications of psychological principles and techniques. Psychology majors have the option of including or excluding hours earned in Psych. 195 in the 42 hours of psychology to which majors are limited. The off-campus semester is offered for 15 hours of credit in this course during the Fall and Spring semesters and for 12 hours of credit during the Summer. Off-campus semester placements generally require completion of Psych. 274 before enrollment in this course. *(No more than 18 hours of Psych. 195 may be counted toward the 128 hours required for the B.A. degree.)*

213. *Directed Studies.* I, II, S. 1-3 hr. PR: Consent. Individually supervised reading, research and/or classroom management projects. (*No more than 12 hours may be applied to the 42 hours of psychology to which majors are limited.*)

218. *History of Systems of Psychology.* I or II. 3 hr. (Recommended especially for students planning graduate study in psychology.) A survey of psychology from its origins in philosophy, biology, and physics through the several major schools of psychological thought to modern perspectives of behavior.

219. *Survey of Psychology.* I. 1 hr. PR: Psychology major. Overview of modern psychology with special reference to problems of graduate and professional training and employment opportunities.

223. *Learning and Memory.* I or II. 3 hr. Theoretical and empirical issues in human and animal learning and memory with emphasis on mechanisms of memory, language, verbal behavior, and conceptual processes.

224. *Experimental Analysis of Behavior.* I or II. 3 hr. Laboratory and lectures survey research in operant conditioning and its implications for behavior theory and applications.

225. *Cognition and Perception.* I or II, S. 3 hr. Current issues and theory in human perception, thinking, language, and information processing.

232. *Physiological Psychology.* I or II. 3 hr. Introduction to the biological foundations and the physiological mechanisms of behavior.

242. *Prenatal and Infant Behavior.* I or II, S. 3 hr. Early influences upon behavior and development are investigated; topics include behavioral genetics, hazards of parental development, sensory and motor development, language development, and socio-emotional development.

243. *Child and Adolescent Behavior.* I or II, S. 3 hr. Theory and research on the major psychological processes in childhood and adolescence are explored including maturation, personality, socialization, sensory, and cognitive development.

245. *Adulthood and Aging.* I or II. 3 hr. Cognition and personality changes from maturity to old age. Psychological reactions to physiological change and to the establishment and dissolution of family units. Problems of intergenerational differences in adult behavior.

251. *Social Psychology.* II. 3 hr. Social factors which determine human behavior. Survey of the results of laboratory research in social psychology and its implications for social phenomena.

262. *Assessment of Behavior.* I or II. 3 hr. (Completion of Stat. 101 or its equiv. is recommended.) Theory and practice in development and use of psychological assessment procedures. Includes intelligence testing, behavioral assessment, interviewing.

263. *Comparative Personality Theory.* I, II. 3 hr. Theoretical and empirical readings in a comparative survey of major perspectives in personality theory, including dynamic, cognitive, humanistic, and behavioral theories of personality.

264. *Psychology of Adjustment.* I, II, S. 3 hr. Dynamic principles of human personality adjustment.

274. *Survey of Behavior Modification.* I. 3 hr. Behavior therapy and modification including desensitization, covert sensitization, interpersonal skill training; aversion techniques and applied behavior analysis employing operant principles.

279. *Community Psychology.* I. 3 hr. Psychological principles applied to treatment and intervention strategies at the community level. Manpower development, organizational change, and systems analysis.

281. *Abnormal Psychology.* I or II. 3 hr. Major categories of behavioral disorders, e.g., neuroses, psychoses, and character disorders are considered in terms of etiology, treatment, outcome, and prevention.

282. *Exceptional Children.* I or II. 3 hr. Study of children who present psychological problems: (1) exceptional mental retardation or advancement; (2) organic disabilities having behavioral consequences, such as cerebral palsy or deafness; (3) behavior disorders.

301. *Personnel Psychology.* I or II. 3 hr. PR: Stat. 101, or equiv. Application of psychological principles and techniques to the problems of measurement and prediction of proficiency in industry and society.

304. *Leadership and Human Relations in Working Groups.* I or II. 1-3 hr. PR: Consent. Individual work related to either research or practice in the field of human relations training programs.

307. *Practicum in Industrial Interviewing.* I or II. 3 hr. PR: Psych. 201 or consent. Intensive review of principles of selection and validation. Practice interviews applying nondirective techniques in employment and other types of interviews.

311. *Research Design and Data Analysis I.* I. 3 hr. Principles of experimental design in psychology including group and single subject methodologies. Topics include: internal and external validity; analysis of and mixed research designs; and reversal and multiple baseline designs.

312. *Research Design and Data Analysis II.* II. 3 hr. PR: Psych. 311 or consent. Inferential statistics, simple correlation and regression, partial correlation, analysis of covariance, analysis of variance of designs with unequal cell sizes.

313. *Directed Study.* I, II, S. 1-3 hr. per sem. PR: Consent. Directed reading and research in special areas. *(Undergraduates register for such projects under Psych. 213.)*

315. *Multivariate Analysis.* I or II. 3 hr. PR: Psych. 311, or 314, or equiv., and consent. Correlational methods in psychology with application to typical research problems. Includes simple matrix algebra, multiple correlation, discriminant analysis, and an introduction to factor analysis. *(Equiv. to Stat. 341.)*

316. *Correlational and Quasi-Experimental Designs.* I. (Alternate Years.) 3 hr. PR: Psych. 311 and 312 or equiv. Consideration of methods, measurement, and analysis of non-experimental research. Includes survey, correlational, and quasi-experimental designs; questionnaire and attitude scale construction; nonreactive measurement techniques; and data analysis.

318. *Ethical and Legal Issues.* II. 2 hr. Ethical standards for psychologists are applied to research and clinical problems. Legal regulations and contemporary issues in mental health are studied.

325. *Behavior Analysis I.* I. 3 hr. PR: Graduate standing in psychology or consent. Conceptual, methodological, and empirical issues in the psychology of learning with emphasis on positive reinforcement and stimulus control; includes laboratory work with animals.

326. *Behavior Analysis II.* II. 1 hr. PR: Psych. 325. Continuation of Psych. 325. Theory and research in aversive control of behavior, including negative reinforcement, punishment, and conditioned suppression.

327. *Behavior Analysis III.* II. 2 hr. PR: Psych. 325, 326. Basic learning principles discovered with animals are extended to basic human research with emphasis upon ways the procedures and situations might be modified for human research and phenomena that are specific to humans.

340. *Advanced Developmental Issues and Methodology.* II. 3 hr. Developmental issues including historical perspectives, validity, theoretical systems, and growth models will be presented along with research methods and designs employed in life-span developmental psychology.

344. *Infant Behavior and Development.* I. (Alternate Years.) 3 hr. Examination of theories of infancy and evaluation of the current literature in the areas of cognitive, perceptual, language and social development. Prenatal and neonatal development will also be emphasized. Related social issues will be discussed.

345. *Child Behavior and Development.* II. (Alternate Years.) 3 hr. Examination of the psychological literature on child behavior and developmental change in learning, cognition, language, social relations, and personality. Experimental research and theoretical explanations are emphasized, and implications for life-span development are discussed.

346. *Adulthood and Aging.* I. (Alternate Years.) 3 hr. Comparative theories of life-span development; current issues in research on adulthood and aging, including personality and socialization, age norms, biological change in adulthood and aging.

350. *Introduction to Behavioral Systems Analysis.* I. 3 hr. PR: Psych. 325 and 326 or consent. (Especially designed for graduate students in psychology.) An introduction to behavioral and systems concepts, methods, and models as they apply to human service management, administration, and evaluation.

352. *Community Psychology.* I. (Alternate Years.) 3 hr. Psychological principles and research findings at the community level are applied to various types of intervention strategies. Manpower utilization, needs assessment, the community mental health movement, complex organization theory, and behavioral systems analysis are included.

360. *Behavior Pathology of Childhood.* I. 3 hr. Survey of types of adjustment problems of children, incidence, and research and theory about etiology.

364. *Child Behavior Modification.* II. 3 hr. Assessment, intervention, and evaluation strategies appropriate for childhood disorders and based on behavior modification principles derived from learning theory.

379. *Introduction to Clinical Psychology.* I. 2 hr. Basic interviewing skills and current problems in the practice of clinical psychology.

381. *Behavior Pathology.* II. 3 hr. PR: Psych. 281 or equiv. Advanced study of experimental research in psychopathology.

Religious Studies

Faculty

Manfred O. Meitzen, Ph.D. (Harvard U.), *Chairman and Professor of Religious Studies.*
Alan W. Jenks, Th.D. (Harvard U.), *Associate Professor of Religious Studies.*
Ottomar F. Cypris, Th.D. (Union Theol. Sem.), *Assistant Professor of Religious Studies.*

Religious studies courses provide instruction in the field of man's experience concerning God, the transcendent, and ultimate concern. Such studies include both the intellectual activity of man about this experience (theology) as well as man's resultant deeds in worship and ritual, ethics, and history. Part of the curriculum is devoted to the study of the world's great scriptures. Another part deals with the history of religions. Another segment deals with contemporary religious thought. Another part probes into the interrelation of theology and culture. Throughout the religious studies program, attention is given to the relevance of the subject matter to the lives of the students at the time in which they are living. While religious studies offers no major, courses in religious studies may be taken for University Core Curriculum credit, as well as elective credit, and are meant for the enrichment of the global, liberal arts education of the student. Also, an interdepartmental major involving religious studies may be undertaken.

Courses of Instruction in Religious Studies (Relig.)

5. *An Introduction to Issues in Religious Studies.* I. 3 hr. (For freshman students only.) Leading issues involved in religious studies: transcendence, the God question, evil, redemption, community, eschatology, symbolism, ethics, examples of the relationship between religion and culture.

50. *Honors Course in Religious Studies.* I or II. 3 hr. Open only to Honors students. A basic, theological topic, which is suitable for study by an undergraduate honors class, will be selected for each semester.

100. *Introduction to the Gospels.* I. 3 hr. The four Gospels of the New Testament, involving a brief introduction to the literature and historical setting of the Gospels with an intensive study of the Christ event. Discusses a number of basic theological issues; and it constantly relates Scripture teaching to the contemporary situation.

101. *A Study of Paul.* II. 3 hr. Introduction to the life and theology of Paul, involving a study of the letters of Paul and other pertinent early Christian literature. Discusses a number of basic theological issues; and constantly relates Scripture teachings to the contemporary situation.

102. *Introduction to the Old Testament.* I. 3 hr. The story of Israel, her religious life, and great personalities up to about 800 B.C., based on a study of Genesis through II Kings. Basic theological and ethical issues are discussed in relation to the contemporary situation.

103. *Introduction to the Old Testament.* II. 3 hr. The story of Israel, her religious life, and great personalities from 800 to about 100 B.C., based on a study of the prophetic and wisdom literature of the Bible. Basic theological and ethical issues are discussed in relation to the contemporary situation.

104. *Origins of Judaism.* I or II. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. Main beliefs and practices of the Jewish religion in its formative period, 500 B.C. to 500 A.D. Selections from late Old Testament writings, the Apocrypha and Pseudepigrapha, the Dead Sea Scrolls, and rabbinical literature. *(Course will not be offered in 1979-80.)*

110. *Contemporary Theology.* I. 3 hr. Issues include: function of reason in Judaeo-Christian faith and relationship of reason and revelation to each other; Judaeo-Christian understanding of history; the question of Biblical literalism. *(Course will not be offered in 1979-80.)*

111. *Contemporary Theology.* II. 3 hr. Issues include: ecumenical movement within Church; the Spirit; recent transformations in ethical and social thinking (new morality); secular theology (new theology), theology of hope. *(Course will not be offered in 1979-80.)*

112. *Existential Theology.* I or II. 3 hr. An introduction into existentialism and its impact on theology. A dialog between the existential problems of man (anxiety, loneliness, meaninglessness, guilt, death, lust, wrath, etc.) and the response of Judaeo-Christian faith.

120, 121. *History of Christian Thought.* I, II. 3 hr. per sem. A study of significant men and movements of thought among the Christians and the way in which these contributed to answering the perennial questions of religion from a Christian perspective. Religious Studies 120 covers the history of Christian thought to 1500; 121 from 1500 to the present time. *(Courses will not be offered in 1979-80.)*

124. *Christian Thought in the Reformation Era.* I or II. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. The significant men and movements in the four primary streams of sixteenth-century Christian thought in western Europe: Protestantism, radical Christianity, Roman Catholicism, and Anglicanism.

126. *Early Medieval Theology and Culture.* I or II. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. The primary ways which early medieval Christian thought responded to the cultural heritage of the West. The rise of the medieval synthesis of theology and culture.

128. *History of American Religion: 1607-1820.* I. 3 hr. The origins, growth, and influence of major religious ideas and movements which were significant in shaping religious life of the American people in colonial and early federal periods. *(Course will not be offered in 1979-80.)*

129. *History of American Religion: 1820 to Date.* II. 3 hr. The origins, growth, and influence of major religious ideas and movements which have been significant in shaping of religious life of the American people since 1820.

130. *World Religions: Religions of India.* I. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. Proto-Indian religion, Hinduism, beginnings of Buddhism, Jainism, Sikhism; historical and theological foundations; developments of thought; contemporary expressions and encounters with modern world.

131. *World Religions: Religions of China and Japan.* II. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. Buddhism, Confucianism, Taoism, Shinto; historical and theological foundations, developments of thought; contemporary expressions and encounters with modern world.

132. *World Religions: Near Eastern.* I or II. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. The ancient religions of Mesopotamia, Egypt, and Iran, and the origin and growth of Islam; historical and theological foundations; developments of thought; scriptures; contemporary expressions and encounters with the modern world.

140. *Theology and Culture.* I. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. An interdisciplinary course involving members of various parts of the faculty of WVU in dialog with a professor of religious studies. The dialog will be carried on with the humanities and the arts. *(Course will not be offered in 1979-80.)*

141. *Theology and Culture.* II. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. An interdisciplinary course involving members of various parts of the faculty of WVU in dialog with a professor of religious studies. The dialog will be carried on with science and technology. *(Course will not be offered in 1979-80.)*

142. *Theological Perspectives in Modern Literature.* I or II. 3 hr. PR: Sophomore standing or above, or a previous religious studies course. Theological perspectives in selected modern writers including Beckett, Camus, Faulkner, Hesse, Hopkins, Wiesel, Eliot, and Auden. Theological insights into nihilism, evil, redemption, and meaning, as well as psychological analyses of religion, will be examined in these authors. Team-taught.

150. *Biblical Ethics and Contemporary Issues.* I or II. 3 hr. Basic topics treated: principal types of ethics, sin, guilt, law, grace, the state, non-biblical ethics, etc. Ethical issues in the post-modern world: bioethics, euthanasia, environmental ethics, sex, etc.

290. *Seminar: Selected Topic.* I or II. 3 hr. PR: A previous religious studies course or consent.

291. *Seminar: Selected Topic.* I or II. 3 hr. PR: A previous religious studies course or consent. *(Course will not be offered in 1979-80.)*

Social Science (S. Sci.)

1, 2. *Introductory General Course.* I, II. 3 hr. per sem. An interdisciplinary course which seeks to acquaint students with the social science disciplines in the first semester as a groundwork for examination of selected contemporary problems of American society from a unified social science perspective in the second semester. Guest lecturers, films, and discussion groups. *(It is recommended that students take S. Sci. 1 before taking S. Sci. 2.)*

91. *Man and His Environment.* I. 3 hr. An examination of some of the facets of the environment which most directly affect human welfare. Central focus on environmental deterioration and corrective public policies. An interdisciplinary, nonprerequisite course for all students in the University. *(Also listed as Biol. 91.)*

191. *Special Topics.* I, II. 1-6 hr. PR: Consent.

Sociology and Anthropology

Faculty

H. Russell Bernard, Ph.D. (U. Ill.), *Professor of Anthropology and Chairman.*
Ronald C. Althouse, Ph.D. (U. Minn.), *Associate Professor.*
Richard A. Ball, Ph.D. (Ohio St. U.), *Professor.*
Harold A. Gibbard, Ph.D. (U. Mich.), *Professor Emeritus.*
David S. Hall, Ph.D. (U. Ky.), *Associate Professor.*
Rusi Hilloowala, Ph.D. (U. Ala.), *Adjunct Associate Professor of Anthropology.*
Harold N. Kerr, Ph.D. (Ohio St. U.), *Professor Emeritus.*
Jiri T. Kolaja, Ph.D. (Cornell U.), *Professor.*
Arnold J. Levine, Ph.D. (Columbia U.), *Professor.*
John D. Lozier, Ph.D. (U. Minn.), *Associate Professor of Anthropology.*
Ann L. Paterson, Ph.D. (Mich. St. U.), *Associate Professor and Associate Chairperson.*
John D. Photiadis, Ph.D. (Cornell U.), *Professor.*
Patricia C. Rice, M.A. (Ohio St. U.), *Assistant Professor.*
John F. Schnabel, Ph.D. (U. N. Dame), *Associate Professor.*
Joseph J. Simoni, Ph.D. (U. N. Dame), *Associate Professor.*
Leonard M. Sizer, Ph.D. (U. Iowa), *Professor.*
Jerold M. Starr, Ph.D. (Brandeis U.), *Associate Professor.*
Roger B. Trent, Ph.D. (U. Wash.), *Associate Professor.*
Neil J. Weller, Ph.D. (U. Mich.), *Assistant Professor.*

Programs

Sociology and anthropology courses constitute an important part of a general liberal education. They foster an awareness of the structure of human societies and of the social processes which operate in all groups, organizations, and institutions. The student is exposed to the methods of inquiry that sociology and anthropology have in common as well as to special knowledge and insights of the two disciplines. Courses in the department also are intended to facilitate the application of sociological and anthropological principles to the wide range of contemporary social problems. Undergraduate training in the department is particularly relevant for students in psychology, political science, economics, social work, education, communication, and the humanities. Sociology and anthropology also constitute an important part of the undergraduate education for those pursuing a career in law, the health professions, and for engineers and others concerned with environmental and ecological problems. Undergraduate training in sociology and anthropology is relevant to careers in the teaching of the social sciences, applied research with governmental agencies, and community development and planning. Majors are well equipped for graduate training in sociology or anthropology in pursuit of an academic career in teaching and research.

Students have the option of concentrating in sociology or in anthropology or in a combination of these two fields.

Majors in Sociology and Anthropology

Departmental majors select a concentration in sociology, in anthropology, or in a combination of sociology and anthropology.

Majors in *all* of the concentrations must fulfill the following requirements:

1. Stat. 101 or equivalent, preferably taken in the sophomore year.
2. Soc. & A. 1, preferably taken in freshman or sophomore years.
3. Soc. & A. 5, preferably taken in freshman or sophomore years.

4. Soc. & A. 201, for the sociology concentration (taken in senior year)
or
Soc. & A. 255, for the anthropology concentration
or
Soc. & A. 201 *and* 255, for the combined sociology and anthropology concentration.
5. Soc. & A. 211.
6. Soc. & A. 256. (Stat. 101 and Soc. & A. 211 are prerequisites.)

In addition to the above, majors concentrating in *sociology* are required to take an additional 15 hours in upper-division sociology courses and a 3-hour, upper-division course in cultural anthropology.

Majors concentrating in *anthropology* are required to take Soc. & A. 152, 12 additional hours in upper-division anthropology (i.e., courses in the 150- and 250-series), and an additional 3-hour course in upper-division sociology.

Majors choosing the combined *sociology and anthropology* concentration are required to take Soc. & A. 152, 9 additional hours in upper-division sociology courses, and 6 additional hours in upper-division anthropology courses.

Courses of Instruction in Sociology and Anthropology (Soc. & A.)

Lower Division

1. *Introduction to Sociology.* I, II, S. 3 hr. Basic course intended to develop a perspective about the nature of social processes and structure of society.

5. *Introduction to Anthropology.* I, II. 3 hr. Essentials of human evolution and culture history with a consideration of varieties of languages and cultures found among peoples of the world.

Upper Division

101. *Principles of Social Organization.* I, II. 3 hr. The major concepts used in the study of society and social life. Emphasis on research findings derived from studies of contemporary American society.

102. *Social Problems.* I, II. 3 hr. Causes of social disorganization in modern society and social life. Emphasis on research findings derived from studies of contemporary American society.

121. *The Family.* I, II. 3 hr. Comparative approach to changing structure and functions of the family institution. The effect of economic, demographic, and cultural changes on male-female relationships, sex roles, marriage, and child care.

122. *The Community.* I or II. 3 hr. Social structure of small towns and rural communities. The community power structure and political participation as they relate to community planning.

131. *Urban Society.* I or II. 3 hr. Ecological, demographic and socio-cultural patterns of cities and their hinterland, including a study of racial and ethnic neighborhoods of inner-city and process of suburbanization.

132. *Criminology.* I, II. 3 hr. Exploration of various theories of criminal behavior; emphasis on a critical study of criminal justice system and efforts to reform the penal system.

133. *Juvenile Delinquency.* I, II. 3 hr. Nature, extent, and causal explanation of forms of juvenile delinquency. The nature of juvenile courts, the correctional system, and prevention programs.

135. *Race Relations.* I or II. 3 hr. Causes and consequences of prejudice and discriminatory practices involving minority group members. Emphasis is on blacks, but social and economic conditions of Indians and other racial and religious minorities are also discussed.

136. *Sociology of Religion.* I or II. 3 hr. Relationship of religion and society. Origin of religious institutions, structure, function, and role in change or stability of the social system.

140. *Social Change in Appalachia.* I or II. 3 hr. Description of early Appalachian society as a prelude to the understanding of the economic, social, and cultural changes taking place today. The family, church, education, social class, and community structure. Programs of directed intervention, change, and development discussed.

151. *Ethnology.* I or II. 3 hr. Descriptive study of peoples and cultures of the world, especially pre-industrial societies.

152. *Physical Anthropology.* I. 3 hr. Fossil evidence for human evolution, racial variation, and relationship between biology and behavior.

154. *Anthropology of War and Aggression.* I or II. 3 hr. Biologically based conceptions of human aggression. Socio-cultural account of human violence and warfare as an instrument for accomplishing goals and a valued form of personal behavior.

155. *Latin American Society and Culture.* I or II. 3 hr. Anthropological evidence of what is "Latin" (Spanish) and what is "American" (Indian) about Latin American society and culture today. Emphasis on pre-historic and colonial experience.

156. *African Society and Culture.* I or II. 3 hr. The peoples and cultures of Black Africa. Impact of colonialism on the region.

157. *The Art of Primitive Peoples.* I or II. 3 hr. The art of prehistoric peoples from the Upper Paleolithic to the Urban Phase and the art of contemporary technologically primitive peoples will be described and functionally analyzed within their individual cultural contexts.

158. *Introduction to Archaeology.* I. 3 hr. Prehistoric cultures of the world and methods used in reconstructing them.

159. *Archaeology of Appalachia.* II. 3 hr. The content, distribution, sequence, and significance of Early Appalachian Indian cultures.

160. *Sociology of Sex Roles.* I or II. 3 hr. Overview of social and cultural influences on sex (gender) roles. Focuses on contemporary social arrangements and ideologies which support expected sex role behavior. Includes historical and cross-cultural comparisons.

201. *Sociological Theory.* I or II. 3 hr. PR: 6 hr. Soc. & A. and Senior standing, or consent. Systematic analysis of major sociological theories viewed from historical perspective and in terms of current research.

203. *Collective Behavior.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. Analysis of riots, demonstrations, crowd and mob behavior, and other forms of social contagion, and a study of behaviors following natural disasters and social unrest.

204. *Complex Organizations.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. The structure and functioning of large-scale, bureaucratic organizations, including studies of industrial organizations, prisons, hospitals, government bureaus, and the military in contemporary society.

205. *Class, Status, and Power.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. Analysis of various systems of social inequality. Emphasis on empirical studies describing social class system, distribution of status and power, and patterns of social mobility in America.

211. *Social Research Methods.* I, II, S. 3 hr. PR: Soc. & A. 1 or 5 or consent. Logic of social research, elements of research design, and problems of measurement, with emphasis on survey research methodology and data analysis.

222. *Community Development.* I or II. 3 hr. PR: Soc. & A. 122, 131, 223 or consent. Application of sociological knowledge of structure of communities for planning pro-

grams and services. Emphasis on techniques of organizing efforts for community change.

223. *Sociology of Rural Life.* I or II. 3 hr. PR: Soc. & A. 1, or consent. Social aspects of rural living. Characteristics of rural population, social structure, and institutional arrangements: family, community, education, religion, recreation, health, welfare, and local government.

231. *Society and Health.* I. 3 hr. PR: 6 hr. Soc. & A. or consent. Health and illness behavior and the social organization of the health professions, including the problems of health-care delivery systems in the United States and in developing areas.

232. *Sociology of Education.* I or II. 3 hr. PR: Soc. & A. 1, or consent. Education as a social institution, cultural and class influences on education, social roles and career patterns in the school system, the school and problems of the community. *(Same as Ed. F. 300.)*

233. *Industrial Sociology.* I or II. 3 hr. PR: Soc. & A. 1 or consent. Cross-cultural studies of work and of the structure and functioning of industrial organizations.

240. *Social Change.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. Sociological analysis of current major changes in our society, of the forces underlying them, and of tensions to which they give rise. Alternative future directions; rational manipulation and planning for social change.

241. *Population Dynamics.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. Demographic analysis focusing on social causes and consequences of variations in fertility, morbidity, mortality, and migration. National and state population policies also considered.

245. *Soviet Society.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. Social and cultural trends in contemporary Soviet Union. Population characteristics and ethnic and nationality diversity; the family, education, political institutions and social classes; agricultural, industrial, and scientific organization. Comparisons with U.S. society.

251. *Technology and Culture Change.* I or II. 3 hr. PR: Soc. & A. 1 or 5 or consent. The importance of tools and techniques in socio-cultural change. A range of small to large-scale technologies is covered in primitive to modern societies.

252. *Culture and Personality.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. How different cultures shape the personalities of their members; concepts such as modal personality and national character.

254. *Anthropological Perspectives on Aging.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. An examination of how social systems, technologically primitive as well as industrially developed, are arranged to accommodate the needs of old people. The course also considers individual aging processes, and demographic and social consequences of increased longevity.

255. *Anthropological Theory.* I. 3 hr. PR: 6 hr. Soc. & A. or consent. Theoretical contributions of anthropology to the social sciences. Key figures of modern anthropology, i.e., Boas, Malinowski, and Mead.

256. *Field Methods.* II. 3 hr. PR: Stat. 101 and Soc. & A. 211 or consent. The distinctive craft of data gathering in cultural anthropology. Development skills in field methods and participant observation.

257. *Primate Behavior.* I or II. 3 hr. PR: 3 hr. of any behavioral science or consent. Primates as they exist in their natural habitats suggest clues to early human behavior and evolution of behavior. Case studies and comparative behavior from prosimians, monkeys, and apes to human hunters and gatherers. *(Same as Biol. 235.)*

260. *Society and Personality.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. Interaction between society and the individual's behavior. Key concepts are social role, and the social self. Focus on adult experiences and adult socialization.

261. *Criminal Justice in America.* I or II. 3 hr. PR: 6 hr. of Soc. & A. or consent. Critical examination of law, police, courts, and corrections (adult and juvenile); conservative, reform, and radical evaluations. Emphasizes such current issues and innovations as civil liberties, victimless crimes, prison reform, professionalization, community-based corrections, behavior modification.

262. *Youth and Social Change.* I or II. 3 hr. PR: 6 hr. Soc. & A. or consent. A structural-historical approach to the study of youth as both product and agent of social change. Emphasizes concepts of human development, life course transition, age stratification, birth cohort, lineage, historical period, and socio-cultural generation.

290. *Special Topics.* I, II, S. 3 hr. PR: 6 hr. Soc. & A. or consent. Course changes so students may enroll more than once.

293. *Independent Study.* I, II, S. 1-3 hr. per sem. PR: 3.0 grade-point average and written departmental permission. Directed reading or research for students desiring work not available in regular course offerings.

311. *Survey Research Methods.* I. 3 hr. PR: Soc. & A. 211 and Stat. 101 or consent. Provides students with an overview of survey design including questionnaire construction, measurement and sampling theory, project management and budgeting, and report writing. Students will be required to submit a complete survey research proposal.

313. *Qualitative Methods.* II. 3 hr. Provides students with supervised field experiences in interviewing, participant observation, and other methods of qualitative data gathering, analysis, and presentation.

322. *Contemporary Sociological Theory.* I or II. 3 hr. PR: 9 hr. Soc. & A. or consent. Review of recent trends and orientations in sociology. Theory construction, typologies, mathematical models and the relationship between theory and research. Review of current literature.

372. *Sociocultural Factors in Health, Illness and Medical Care.* II. 3 hr. PR: 9 hr. Soc. & A. or consent. Distribution of disease in the population and patterns of illness behavior. Sociological study of the health professions, community health care institutions, and the cost and organization of health services.

395. *Field Work.* I, II, S. 1-6 hr. PR: Departmental consent. Supervised field work.

Speech Communication

Faculty

James C. McCroskey, Ed.D. (Penn. St. U.), *Chairman and Professor.*
Janis F. Andersen, Ed.D. (WVU), *Assistant Professor.*
Peter A. Andersen, Ph.D. (Fla. St. U.), *Assistant Professor.*
Leonard M. Davis, Ph.D. (Northwestern U.), *Professor.*
Betty Snyder Hall, M.A. (WVU), *Assistant Professor.*
Guy E. Lometti, Ph.D. (U. Wisc.), *Assistant Professor.*
Barry F. Morganstern, Ph.D. (U. Mo.), *Assistant Professor.*
Enid Portnoy, M.A. (Northwestern U.), *Assistant Professor.*
Virginia P. Richmond, Ph.D. (U. Nebr.), *Assistant Professor.*
Walter H. Rockenstein, Ph.D. (Northwestern U.), *Associate Professor.*
Michael D. Scott, Ph.D. (U. So. Calif.), *Associate Professor.*
John Shibley, Ph.D. (Ohio St. U.), *Associate Professor.*
Lloyd W. Welden, Sr., M.A. (U. Mo.), *Professor Emeritus.*
Lawrence R. Wheeless, Ph.D. (Wayne St. U.), *Professor.*
Thomas J. Young, Ph.D. (U. Ore.), *Assistant Professor.*

Programs

The Department of Speech Communication offers a curriculum designed to meet the needs of liberal arts and pre-professional students. The undergraduate curriculum focuses upon the application of theory and research in human communication to a variety of personal and social settings.

In addition a major and a minor in speech communication are available for students wishing to pursue in-depth study in the field. The major and minor provide: (1) general core of basic theory, research, and application; and (2) flexibility in electives which allows the major to emphasize course work in a particular area. Emphasis in the major supplies a background useful for those anticipating futures in teaching, organizations, and institutions, mass communication, professional schools, or graduate study. (Those students anticipating teaching also must fulfill certification requirements of the State Board of Education.)

Major in Speech Communication

The minimum requirement for a major in speech communication is 36 semester hours of credit (18 hours must be in upper-division courses). A total of 42 hours in speech communication may be counted toward graduation.

Required Courses

The following core of courses is required of all majors: Spch. 11, 111, 133, 160, and 180. Students should choose electives from offerings in the department to complete minimum semester hours of credit required for the major (36 hours).

Recommended Electives

Area Emphases. The following courses are recommended departmental electives for majors wishing to emphasize interpersonal communication: Spch. 106, 107, 221, 370, 371, and 377, plus additional 300-level courses.

The following courses are recommended departmental electives for majors wishing to emphasize mass communication: Spch. 80, 106, 107, 221, 281, and 372.

The following courses are recommended departmental electives for majors wishing to emphasize organizational and institutional communication or who seek a pre-professional background in communication: Spch. 80, 106, 107, 109, 221, 370, 371, and 376.

Majors, especially freshmen and sophmores, should consult the requirements for the Bachelor of Arts degree. Recommendations for courses and minors that complement a major in speech communication and which fulfill College of Arts and Sciences requirements can be secured by consulting the Academic Advising Center (freshmen and sophomores) or academic advisers in the department (juniors and seniors). Majors should consult carefully with advisers in planning courses of study.

Recommended Courses in University Core Requirements. The following courses are recommended to majors for fulfilling University Core Curriculum requirements for graduation: (Group A, 12 hr.) — Phil. 1, 51, 104, 158, 185; (Group B, 12 hr.) — Econ. 51, 241, 245, 262, Pol. S. 140, 214, 232, 295, 343, Psych. 1, 2, 101, 121, 122, 123, 151, 253, 262, 263, 311, 314, 351, 352, Soc. & A. 1, 131, 203,

204, 211, 233, 240, 253; (Group C, 12 hr.) — Biol. 1, 2, Com. S. 1, Geol. 2, 5, Stat. 101, 201, 213, 214, 231, 311, 341.

Recommended Minors and Electives: Majors in speech communication are advised (not required) to pursue a minor concentration or electives in an area(s) related to their emphasis or interests. Following are recommended for consideration: journalism, business, psychology, sociology and anthropology, philosophy, and political science.

Courses of Instruction in Speech Communication (Spch.)

Lower Division

11. *Principles of Human Communication.* I, II, S. 1 hr. Introduction to the human communication process with emphasis on the principles, variables, and social contexts of communication.

12. *Human Communication in the Interpersonal Context.* I, II, S. 2 hr. PR or Conc.: Spch. 11. Introduction to interpersonal communication with emphasis upon application of one-to-one communication in a variety of social contexts.

13. *Human Communication in the Small Group.* I, II, S. 2 hr. PR or Conc.: Spch. 11. Introduction to small group communication with emphasis upon application in a variety of social contexts.

14. *Human Communication in the Public Communication Context.* I, II, S. 2 hr. PR or Conc.: Spch. 11. Introduction to principles of communication in the one-to-many context.

21. *Human Communication in a Contemporary Society.* I, II, S. 3 hr. Introduction to principles of communication and decision making on significant issues in a free society. Emphasis on topics such as freedom of speech and press.

80. *Introduction to the Mass Media.* I, II, S. 3 hr. Critical examination of mass media with special emphasis on ways in which social, economic, and psychological factors influence the structure, functions, and effects of the media.

Upper Division

105. *Special Topics in Human Communication.* I, II, S. 3 hr. (Repeatable to 6 hr. total.) PR: Spch. 11. Topics include communication and conflict resolution, role of communication in negotiation and bargaining, contemporary communication criticism, issues in communication fields, etc.

106. *Nonverbal Communication.* I, II, S. 3 hr. PR: Spch. 11. Nonverbal messages and codes with attention to communication effects of time, space, kinetics, touch, objects, social contexts, and physical surroundings.

107. *Human Communication and Rational Decision.* I, II. 3 hr. Argumentation, small group, persuasion, and systems theories application to the process and outcome of rational decision-making in communication. Some emphasis on critical-rational response to manipulative communication.

108. *Nonviolence in Communication Behavior.* I, II. 3 hr. Nonviolent resistance as communication behavior. Emphasis on major proponents of and upon learning ways to apply nonviolence in communication behavior.

109. *Human Communication in Organizations and Institutions.* I, II, S. 3 hr. PR: Spch. 11. Communication processes and problems in business and nonbusiness organizations and institutions with attention to practical application.

111. *Human Communication and Social Change.* I, II, S. 3 hr. Communication in the societal setting with emphasis on communication of innovations, diffusion of information, and adoption of change.

133. *Interpersonal Communication.* I, II, S. 3 hr. PR: Spch. 11. Survey of theoretical and research literature in interpersonal communication. Emphasis on interaction, in-

terpersonal understanding, personal relationships, and self understanding as outcomes in interpersonal communication.

160. *Communication Research Methods.* II. 3 hr. PR: Spch. 11, 12 hr. speech communication, or consent. Research methods in human communication with emphasis on experimental procedures, design, analysis, and interpretation.

161. *Directed Studies in Human Communication.* I, II, S. 3 hr. (Repeatable to 6 hr. total.) PR: Spch. 160 or consent. Communication study and research in special areas of human communication.

180. *Effects of Mediated Communication.* I, II, S. 3 hr. PR: Spch. 11. Messages and characteristics of mass media with emphasis on effects of mass communication on society.

187. *Appreciation of the Motion Picture.* I, II. 3 hr. Evaluation of motion picture and television film as art forms and as forms of mediated communication, involving aesthetic and communication principles. Various types of films considered. Viewing lab; viewing ticket purchase required.

190. *Teaching Practicum.* I, II. 1-3 hr. PR: Consent.

191. *Special Topics in Speech Communication.* I, II, S. 1-3 hr. (Repeatable to 6 hr. total.) PR: Consent.

195. *Field Experiences in Human Communication.* I, II, S. 1-3 hr. (Repeatable to 12 hr. total.) PR: Consent.

201. *Principles of Communication Education.* I, II, S. 3 hr. PR: 15 hr. speech communication. Literature, principles, and current practices of communication education in public schools with directed application. Intended for teachers in communication and language arts.

206. *Advanced Study in Nonverbal Communication.* I, II. 3 hr. PR: Spch. 106. Functions of nonverbal communication including status, power, immediacy, relationship development, regulation, turn-taking, leakage and deception, intuition, person perception and emotional expressions.

221. *Persuasion.* I, II, S. 3 hr. PR: Spch. 11. Theory and research in persuasion, emphasizing a critical understanding and working knowledge of the effects of social communication on attitudes, beliefs, and behavior.

275. *Communication Problems of Children.* I, II, S. 3 hr. PR: Spch. 11. Primarily for elementary and secondary school teachers and language arts supervisors. Normal maturational development of listening and speaking skills, their relationships to language acquisition, and influence upon achievement.

281. *Media in Communication and Education.* I, II. 3 hr. Use of the media in educational and other communication environments with emphasis on communication processes and principles relevant to television and film.

361. *Communication in the Classroom.* I, II, S. 3 hr. PR: Teaching experience or consent. The role of interpersonal communication in the classroom environment, with particular emphasis on communication between students and teachers. Recommended for elementary, secondary, and college teachers in all fields.

362. *Nonverbal Communication in the Classroom.* I, II, S. 3 hr. PR: Spch. 361. The impact of nonverbal communication behaviors of students and teachers on teacher-student interaction and student learning. Recommended for elementary, secondary, and college teachers in all fields.

363. *Communication in the Educational Organization.* I, II, S. 3 hr. PR: Spch. 361. Problems of communication within educational organizations with emphasis on elements that impact educational change, conflict management, and interpersonal influence. Recommended for elementary, secondary, and college teachers in all fields.

370. *Interpersonal Communication: Theory and Research.* II. 3 hr. PR: Consent. Survey of the theory and research in dyadic interpersonal communication. Attention to accuracy, coordination, and congruency models with emphasis upon relational communication and intimate communication in interpersonal relationships.

371. *Theory and Research in Language.* I, II, S. 3 hr. Syntactics, semantics, and pragmatics of language behavior. Analyses of contemporary linguistic theories.

372. *Theory and Research in Mass Communication.* I, II, S. 3 hr. Mass communication from a consumer's viewpoint. Use of consumer-oriented mass media research also stressed.

373. *Theory and Research in Persuasion.* I, II, S. 3 hr. Various theories and principles of persuasion with emphasis on contemporary research literature.

374. *Theory and Research in Diffusion.* I, II, S. 3 hr. Advanced seminar in communication and change in various cultures. Special emphasis on research in diffusion of innovations and special topics such as communication strategies for population control, communication of technical information, in the developing countries.

376. *Theory and Research in Organizational Communication.* I, II, S. 3 hr. Contemporary research linking communication variables and networks to organizational change, effectiveness, leadership, power and management practices. Analysis of communication problems within a variety of organizations.

377. *Small Group Theory and Practice.* I, II, S. 3 hr. Specific research areas in interpersonal communication with intensive emphasis on small groups.

Statistics and Computer Science

Faculty

Donald F. Butcher, Ph.D. (Iowa St. U.), *Chairman and Professor of Statistics.*
William N. Anderson, Ph.D. (Carnegie-Mellon U.), *Associate Professor of Computer Science.*
Wayne A. Booth, M.S. (WVU), *Instructor (part-time) in Computer Science.*
Daniel M. Chilko, M.S. (Rutgers U.), *Associate Professor of Statistics.*
Cynthia A. Deitz, M.S. (WVU), *Instructor (part-time) in Computer Science.*
William H. Dodrill, M.S. (MIT), *Associate Professor of Computer Science.*
Shirley M. Dowdy, Ph.D. (U. N. Dame), *Associate Professor of Statistics.*
Erdogan Gunel, Ph.D. (SUNY — Buffalo), *Visiting Assistant Professor of Statistics.*
Judith C. Hall, M.S. (Harvard U.), *Assistant Professor of Statistics.*
E. James Harner, Jr., Ph.D. (Cornell U.), *Associate Professor of Statistics.*
Gerald R. Hobbs, Jr., Ph.D. (Kans. St. U.), *Assistant Professor of Statistics.*
John M. Krall, Ph.D. (U. Iowa), *Associate Professor of Statistics.*
James A. Kutsch, Jr., Ph.D. (U. Ill.), *Assistant Professor of Computer Science.*
Steve J. Lahoda, Ph.D. (VPI), *Assistant Professor of Statistics.*
Malcolm G. Lane, Ph.D. (Duke U.), *Associate Professor of Computer Science; Associate Chairman.*
Thomas W. McIntyre, Ph.D. (UCLA), *Adjunct Associate Professor of Computer Science.*
Philip L. Miller, Ph.D. (Ohio St. U.), *Assistant Professor of Statistics.*
Wayne A. Muth, Ph.D. (Iowa St. U.), *Professor of Computer Science.*
Y. V. Reddy, Ph.D. (WVU), *Assistant Professor of Computer Science.*
Phillip D. Stark, M.S. (U. Mo.), *Instructor (part-time) in Statistics and Computer Science.*
William J. Strider, M.S. (WVU), *Instructor (part-time) in Computer Science.*
William V. Thayne, Ph.D. (U. Ill.), *Professor of Statistics.*
Edwin C. Townsend, Ph.D. (Cornell U.), *Associate Professor of Statistics.*
George E. Trapp, Jr., Ph.D. (Carnegie-Mellon U.), *Professor of Computer Science.*
Stanley Wearden, Ph.D. (Cornell U.), *Professor of Statistics; Dean of Graduate School.*

Programs

The Bachelor of Science degree program is designed to qualify a student for professional positions in industry, research, or government service. At the same time it prepares the student for graduate study in the student's own discipline or in some other academic area of quantitative science.

The field of statistics presents methods of making decisions on the basis of probability. The baccalaureate program in statistics is intended to train a student to combine the scientific method with mathematics and inductive reasoning in order to serve on a research team as a member who can design experiments, analyze the results, and draw inference from them.

A student interested in a career in actuarial science should so inform the department after successful completion of Math. 51 and Stat. 262. At that time the student can be nominated as qualified to take Part 1 and Part 2 of the actuarial examinations sponsored by the Society of Actuaries.

The Computer Science program is intended to educate students in the following areas of computer science: mathematical procedures, programming languages, systems programming, information analysis, and systems design. After taking an upper-division course in at least three of these areas (Com. S. 220, 230, 240, 260, and 270), students are encouraged to take advanced course work in areas of interest to them.

Major in Statistics

Statistics majors must complete at least 60 hours of upper-division course work with at least 35 of these upper-division hours in statistics, computer science, and mathematics. At least 26 of these 35 hours must be in statistics. A student must have at least a C in all courses counted towards meeting the 35 upper-division hours in statistics, computer science, and mathematics.

Statistics majors need at least a 2.5 grade-point average in all mathematics, statistics, and computer science courses attempted during their first two years of study to be admitted to the program. At a minimum this would include Math. 15, 16, 51; Stat. 101, 212; and Com. S. 1, 2. Students failing to meet this requirement can petition the departmental Admissions Committee for provisional admission. Special consideration may be given to students who have not completed these courses, but have shown they can perform outstanding college work.

Required Courses

Math. 15, 16, 51, 241 (or Stat. 223); Com. S. 1, 2; Stat. 101, 196, 197, 212, 213, 261, 262; three of the following: Stat. 221, 231, 251, 291, 341, 351, 371, 381; 6 additional hours of upper-division course work in mathematics, statistics, and/or computer science, and at least 60 hours of upper-division course work.

No more than 6 hours of 190-199 course work may be used in fulfilling the 35-hour, upper-division requirement in statistics, computer science, and mathematics; no more than 10 hours of 190-199 course work in any field may be used in fulfilling the 60-hour, upper-division requirement.

Recommended Electives

Any course listed above plus Stat. 190, 195, 313, 361, 362, Com. S. 50, 51, 120, 220, 221, 230, 240, 260, 270; Math. 113, 163, 213, 251, 252, 255; E.E. 201; I.E. 250.

Major in Computer Science

Computer Science majors must complete at least 60 hours of upper-division course work with at least 23 hours of upper-division course work in computer science and 3 hours in statistics. The 23 hours of upper-division course work in computer science may include 6 hours of approved technical electives. A student must have at least a C in all courses counted towards meeting the 23 upper-division hours in computer science and/or approved technical electives.

Computer Science majors need at least a 2.5 grade-point average in each sequence, Com. S. 1-2 and Com. S. 50-51, to be admitted to the program. Students not meeting this requirement may petition the Departmental Academic Standards Committee, in writing, for special consideration. Special consideration may be given to students who have not completed these courses but have shown they can perform outstanding college work.

Required Courses

Math. 15, 16; Stat. 101; Com. S. 1, 2, 50, 51, 196; one course of Com. S. 120, Math. 51, or Math. 18; 15 hours of 200-level Com. S. course work, at least 9 hours of which must be selected from Com. S. 220, 230, 240, 260, 270; 6 hours of approved upper-division electives; and at least 60 hours of upper-division course work. No more than 10 hours of 190-199 course work may be used in fulfilling the 60-hour upper-division requirement. A list of approved upper-division electives is available from the department's office.

Recommended Electives

Com. S. 190, 195, 221, 223, 241, 261, 310, 320, 330, 340; Stat. 212, 221, 231, 261, 262, 312, 313, 341, 351, 371, 381; Math. 51, 113, 163, 213, 251, 252, 255, 291, 292; Econ. 54, 55, 211, 212; Acctg. 51, 52, 111, 112, 113, 213; Manag. 105, 111, 112; Bus. 111, 112, 115, 120; Fin. 111, 112.

Courses of Instruction in Statistics (Stat.)

Upper Division

101. *Elementary Statistical Inference.* I, II. 3 hr. PR: Math. 3. Basic concepts of descriptive and inferential statistics: descriptive measures, random variables, sampling distributions, estimation, tests of hypotheses, chi-square tests, regression and correlation. *(Equiv. to Econ. 125.)*

190. *Teaching Practicum.* I, II, S. 1-4 hr. (May be repeated for a maximum of 6 hours.) PR: Stat. 201 and 261. Practical classroom experience for undergraduate teaching assistants. Tasks assigned are those designed to provide experience with course design, implementation, evaluation, and revision of classroom work.

195. *Field Experience.* I, II, S. 1-18 hr. PR: Stat. 262 or equiv. Course for those who wish to work with faculty and field supervisors to design field experiences with planned learning objectives and credit goals. *(Total credit applicable to any Arts and Sciences degrees may not exceed the maximum of 18 hours.)*

196. *Statistics Seminar.* II. 1 hr. PR: Student must be statistics major. Satisfactory completion of the course requires that the student present a 20- to 50-minute talk on a selected topic and attend all scheduled meetings.

197. *Statistics Practicum.* I. 1 hr. PR: Stat. 101 and Com. S. 1. (Open to statistics majors only.) Analysis of actual experiments using a computer under supervision of a faculty member.

212. *Intermediate Statistical Methods.* I, II. 3 hr. PR: Stat. 101. Extension of basic concepts of statistical inference: estimation and hypothesis testing for two populations, multiple regression and correlation, curvilinear regression, non-parametric tests, analysis of variance and covariance.

213. *Introductory Design and Analysis.* I. 3 hr. PR: Stat. 212. An introduction to the general linear model, the complete and fractional factorial experiment, and the completely random, randomized complete block, latin square, and split plot experimental designs.

221. *Statistical Computer Techniques.* I. 3 hr. PR: A programming language; and Conc.: Stat. 212 or equiv. Computer generation of pseudorandom numbers and tests of randomness. Elementary computer simulations relating to estimation and tests of hypothesis. Computer algorithms for basic statistical methods. *(Course offered in Fall of alternate years.)*

223. *Applied Matrix Algebra.* I. 3 hr. PR: Math. 18 or 51. Elementary matrix concepts and operations, vector spaces, characteristic roots and vectors, generalized inverses, systems of linear equations, patterned matrices, orthogonal and other special matrices. (Equiv. to Com. S. 223 and Math. 223.)

231. *Sampling Methods.* I. 3 hr. PR: An introductory course in statistics. Methods of sampling from finite populations, choice of sampling unit, sample survey design, estimation of confidence limits and optimum sample size, and single and multistage sampling procedures.

251. *Data Analysis.* II. 3 hr. PR: Stat. 213. Computer analyses of simulated or real unbalanced data using a matrix approach to linear models. The techniques will include least squares analysis of variance and covariance, multiple and polynomial regression, and multiple discrimination. *(Course offered in Spring of alternate years.)*

261. *Statistics and Probability 1.* I. 3 hr. PR: Math. 16. Events, random variables, discrete and continuous probability distributions. Expected value, moment generating, functions, special probability distributions. Sampling including random samples and distributions of certain functions of random variables. The central limit theorem.

262. *Statistics and Probability 2.* II. 3 hr. PR: Stat. 261. An introduction to statistical inference. Properties of estimators and techniques of estimation. Hypotheses testing including the Neyman-Pearson lemma and likelihood ratio tests. Regression and correlation including least squares. Selected topics.

264. *Fundamentals of Statistical Theory.* II. 3 hr. PR: Math. 16 or equiv. and introductory statistics. Random variables and their probability distributions. Properties of estimators and methods of estimation. Principles of hypothesis testing.

291. *Special Topics.* I, II, S. 1-6 hr. Advanced study of special topics in statistics.

311. *Statistical Methods 1.* I, II. 3 hr. PR: Math. 3. Statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression, correlation, transformations, F and Chi-square distributions, analysis of variance and multiple comparisons. *(Equiv. to Ed. P. 311, Psych. 311, and Stat. 311ABE.)*

311A. *Introductory Probability and Testing Hypotheses.* 1 hr. Basic laws of probability, binomial distribution, normal distribution, and testing hypotheses about parameters of these distributions.

311B. *Normal Distribution Tests of Hypotheses.* 1 hr. PR: Stat. 101 or 311A or equiv. Chi-square and f-test for hypotheses concerning variances, t-test and f-test for hypotheses concerning means.

311C. *Nonparametric Methods for Nominal Data.* 1 hr. PR: Stat. 311 or 311A or equiv. Levels of measurement, tests of normality, one-, two-, and k-sample tests for nominal data.

311D. *Nonparametric Methods for Ordinal Data.* 1 hr. PR: Stat. 311 or 311A. Test for skewness and kurtosis and for shifts in locations. One-, two-, and k-sample tests for ordinal data.

311E. *Regression, Correlation, and Contingency Analysis.* 1 hr. PR: Stat. 311B or equiv. Simple linear regression and correlation analysis. Contingency analysis including chi-square tests and measures of association.

311F. *Principles of Sampling.* 1 hr. PR: Stat. 311A or equiv. Design of questionnaires, methods of data collection, and common sample survey designs.

311G. *Special Topics in Statistical Methods.* 1 hr. PR: 3 hr. of introductory statistics. Covers statistical methods not presented in the Stat. 311/312 series. Possible topics: time series, data analysis, advanced sampling, multivariate methods, etc. *(Course will be offered upon sufficient demand.)*

312. *Statistical Methods 2.* I, II. 3 hr. PR: Stat. 212 or 311 or equiv. Completely random, randomized complete block, latin square and split-plot experimental designs. Unplanned and planned multiple and orthogonal comparisons for qualitative and quantitative treatments and factorial arrangements. Multiple linear regression and covariance analysis. *(Equiv. to Ed. P. 312, Psych. 312, and Stat. 312 ABC.)*

312A. *Regression Analysis.* 1 hr. PR: Stat. 311A or equiv. Matrix approach to simple and multiple regression analysis, finding best equation, and tests of hypothesis.

312B. *Introductory Analysis of Variance.* 1 hr. PR: Stat. 311B or equiv. Comparison of group means in the completely randomized design including multiple comparisons, orthogonal contrasts, and factorial arrangements of treatments.

312C. *Design and Analysis of Experiments I.* 1 hr. PR: Stat. 312B or equiv. Use of randomized complete block, Latin square and split-plot designs and analysis of covariance to reduce experimental error.

312D. *Design and Analysis of Experiments II.* 1 hr. PR: Stat. 312C or equiv. Power of tests, relative efficiency of basic designs, and choice of alternative designs.

312E. *Unequal Numbers Analysis of Variance.* 1 hr. PR:. Stat. 312 A and 312B. Unequal subclass numbers analysis of variance, use of different restrictions, and tests of hypothesis.

313. *Design of Experiments.* II. 3 hr. PR: Stat. 312 or equiv. Expected mean squares, power of tests and relative efficiency for various experimental designs. Fixed, random, and mixed models. Use of sub-sampling, covariance and confounding to increase power and efficiency.

341. *Applied Multivariate Analysis.* I. 3 hr. PR: Stat. 212 or 311 or equiv. Introduction to Euclidean geometry and matrix algebra, multiple and multivariate regression including multiple and canonical correlation, the k-sample problem including discriminant and canonical analysis, and structuring data by factor analysis, cluster analysis, and multidimensional scaling.

351. *Applied Regression Analysis.* I. 3 hr. PR: Stat. 312. Matrix approach to linear and multiple regression, selecting the "best" regression equation, model building, and linear models approach to analysis of variance and analysis of covariance.

361. *Theory of Statistics 1.* I. 3 hr. PR: Math. 51. Probability and random variables, univariate and multivariate distributions, expectations, generating functions, marginal and conditional distributions, independence, correlation, functions of random variables including order statistics, limiting distributions, and stochastic convergence.

362. *Theory of Statistics 2.* II. 3 hr. PR: Stat. 361. Techniques of point and interval estimation, properties of estimates including bias, consistency, efficiency and sufficiency; hypothesis testing including likelihood ratio tests and Neyman-Pearson Lemma; Bayesian procedures, analysis of variance and nonparametrics.

371. *Introduction to Exploratory Data Analysis.* I. 3 hr. PR: An introductory statistics course. Basic ways in which observations given in counted and measured form are approached. Pictorial and arithmetic techniques of display and discovery. Methods employed are robust, graphical, and informal. Applications to social and natural sciences. *(Course offered in Fall of alternate years.)*

381. *Nonparametric Statistics.* II. 3 hr. PR: Stat. 311 or equiv. Distribution-free procedures of statistical inference. Location and scale tests for homogeneity with two or more samples (related to independent), tests against general alternatives.

Courses of Instruction in Computer Science (Com. S.)

Lower Division

1. *Introduction to Computer Science.* I, II, S. 4 hr. Algorithms, programs and computers. Organization and characteristics of computers. Basic programming structure.

2. *Computer Language Concepts.* I, II, S. 4 hr. PR: Com. S. 1 or equiv. Problem oriented and machine oriented language and their uses. Programming in scientific, business, and assembly languages.

5. *Computer Applications for Business.* I, II. 4 hr. Algorithms, programs and computers. Organization and characteristics of computers. Basic program structure. Programming in the FORTRAN language. Emphasis on business applications.

10. *Introduction to Computing Concepts.* I. 1 hr. This course is suitable for a brief cultural exposure to computing, and as preparation for the specific language courses Com. S. 20, 30, and 60.

20. *Introduction to FORTRAN Programming.* I. 1 hr. PR: Com. S. 10 or consent. For persons with some computer knowledge, but who have never learned a programming language. (Not open to students with credit for Com. S. 1, 31, or 61.)

21. *Intermediate FORTRAN Programming.* I. 1 hr. PR: Com. S. 1, 20, 31 or 61. An intermediate level course in FORTRAN for students who know another language, or who have some FORTRAN experience.

30. *Introduction to PL/I Programming.* I. 1 hr. PR: Com. S. 10 or consent. For students with some computer knowledge but who have never learned a programming language. (Not open to students with credit for Com. S. 1, 21, or 61.)

31. *Intermediate PL/I Programming.* I. 1 hr. PR: Com. S. 21, 61 or consent. An intermediate level course in PL/I for students who know another programming language, or who have some PL/I experience.

50. *Principles of Computer Science I.* I. 4 hr. PR: Com. S. 2. Designed to expand student capabilities in computer programming and applications implementation technology. Major topics include computer structure and organization, input-output and storage devices, systems organization, subroutines, macros, instructions, data, addressing, job control language, and job control.

51. *Principles of Computer Science II.* II. 4 hr. PR: Com. S. 50. Continuation of Com. S. 50. Major topics include linkage editing and cataloged procedures, searching and sorting, assembly and compilation, and storage structures such as queues, lists, and trees.

60. *Introduction to COBOL Programming.* I. 1 hr. An overview of file structure and design to enable students to develop an understanding of COBOL'S main features.

61. *Intermediate COBOL Programming.* I. 1 hr. PR: Com. S. 1, 21, 31, or 60. Program organization and elements will be covered. Assignments will illustrate COBOL's ability to manipulate different types of files.

Upper Division

120. *Discrete and Numerical Methods.* I, II. 4 hr. PR: An introductory computer programming course and Math. 16. Set algebra, propositional logic and applications to

circuits. Directed and undirected graphs, trees. Errors in numerical computation; interpolation, quadrature, solution of nonlinear and differential equations. Finite Markov chains, queueing theory.

190. *Teaching Practicum.* I, II, S. 1-6 hr. (May be repeated for a maximum of 6 hours.) PR: Com. S. 51. Practical classroom experience for undergraduate teaching assistants. Tasks assigned are those designed to provide experience with course design, implementation, evaluation and revision of classroom work.

195. *Field Experience.* I, II, S. 1-18 hr. PR: Com. S. 51. Course for those who wish to work with faculty and field supervisors to design field experiences with planned learning ojbectives and credit goals. *(Total credit applicable toward any Arts and Sciences degrees may not exceed the maximum of 18 hours.)*

196. *Computer Science Seminar.* II. 1 hr. PR: Senior standing. Satisfactory completion of the course requires that the student present a 20- to 50-minute talk on a selected topic and attend all scheduled meetings.

197. *Computer Science Practicum.* I, II, S. 1 hr. PR: Com. S. 51. (Open to computer science majors only.) Assisting in operation of a computer to become familiar with computer and peripheral devices. *(Course will not be offered in 1979-80.)*

220. *Numerical Analysis 1.* I. 3 hr. PR: Math. 16 and Com. S. 120 or consent. Solutions of equations, interpolation and approximations. Numerical differentiation and integration. Numerical solution of initial value problems in ordinary differential equations. *(Equiv. to Math. 321.)*

221. *Numerical Analysis 2.* II. 3 hr. PR: Math. 241 and Com. S. 220 or consent. Solutions of linear systems by direct and iterative methods. Matrix inversion, evaluation of determinants, and calculation of eigenvalues and eigenvectors of matrices. Application to boundary value problems in ordinary differential equations. *(Equiv. to Math. 322.)*

223. *Applied Matrix Algebra.* I. 3 hr. PR: Math. 18 or 51. Elementary matrix concepts and operations, vector spaces, characteristic roots and vectors, generalized inverses, systems of linear equations, patterned matrices, orthogonal and other special matrices. *(Equiv. to Stat. 223 and Math. 223.)*

230. *Programming Languages.* I. 3 hr. PR: Com. S. 51. Formal definition of programming languages including specification of syntax and semantics. Structure of simple statements and algorithmic languages. List processing and string manipulation languages.

240. *Systems Programming.* I, II. 4 hr. PR: Com. S. 51. Software organization for the support of computer components. Addressing techniques process and data modules, file system organization and management. Traffic control and communication with peripheral devices.

241. *Systems Programming.* II. 3 hr. PR: Com. S. 240. Memory management; name management; file systems; segmentation; protection; resource allocation; pragmatic aspects in the design and analysis of operating systems.

248. *Programming Small Computers.* II. 3 hr. PR: Com. S. 51. Processing of data using small laboratory digital computers.

260. *Information Analysis.* II. 3 hr. PR: Com. S. 51. Information analysis and logical design of a computer system. Exercises and case studies are used to give students proficiency in information analysis techniques. Projects assigned to provide practical experience in systems development and implementation.

270. *System Design.* I. 3 hr. PR: Com. S. 51. Underlying principles of system design and techniques. A theme to be carried throughout the course is the iterative nature of the analysis and design process. Implementation and conversion problems also are considered. Practical projects are assigned to give students experience in actual situations.

291. *Special Topics.* I, II, S. 1-6 hr. PR: Consent. Advanced study of special topics in computer science.

301. *Computers in Research 1.* I. 3 hr. (Statistics and Computer Science majors should get approval of their graduate committee before taking this course for credit.) Use of computers in research. Organization and characteristics of computers. Algorithms, machine language programming, scientific oriented language programming subprograms, program segmentation and linkage.

301A. *Computer Applications.* 1 hr. A discussion of networks, hardware, software, computer application, and social considerations.

301B. *FORTRAN IV Programming.* 1 hr.

301C. *Job Control Language.* 1 hr. PR: Com. S. 301B or consent. Job control language required to effectively utilize the WVNET computing system.

310. *Application Programming.* I. 3 hr. PR: Programming knowledge. Mathematical and scientific programming. Topics include: random numbers, graphs, trees, network flows, sorting and searching algorithms.

311. *Application Programming 2.* II. 3 hr. PR: Com. S. 310 or consent. Continuation of Com. S. 310 where students work on a particular project under supervision of a faculty member and present a written and oral report on their project.

320. *Numerical Solution of Linear Equations.* 3 hr. PR: Com. S. 120 or consent. Numerical solution of large systems of linear equations using direct and iterative methods. Calculation of inverses and generalized inverses of matrices. Numerical methods for the determination of eigenvalues and eigenvectors.

330. *Design of Language Processors.* II. 3 hr. PR: Com. S. 230. Study of the design and construction of automatic programming language processors. Investigation of the structure of scientific and business oriented compilers, list processors and information processing languages.

340. *Theory of Operating Systems.* I. 3 hr. PR: Com. S. 240. Theoretical aspects of multiprogrammed and virtual operating systems. Topics include: concurrent processes, processor management, storage management, scheduling algorithms, and resource protection.

341. *Computer Systems.* II. 3 hr. PR: Com. S. 340, Stat. 312, or consent. Simulation, evaluation, and measurement of computer systems. Techniques of measurement and evaluation using hardware and software monitors, methods of model validation, and creation of management reports.

360. *Design of Database Systems.* I. 3 hr. PR: Com. S. 260. Design, evaluation, implementation and user interface of database systems. Topics include: storage structures, data languages, security and relational, hierarchical and network implementation approaches.

370. *System Implementation.* II. 3 hr. PR: Com. S. 220, 260, and 270. Underlying principles of system implementation are covered both from a theoretical and from a practical point of view. As part of the course, each student will participate with other students in the implementation of a production system.

College of Business and Economics

The College of Business and Economics prepares students to work in business firms and other complex organizations. Whether you intend to operate a small firm or expect to join a large corporation, your program in business and economics will help you develop managerial skills.

A well-rounded selection of liberal arts courses contributes to your personal development. Courses such as statistics and business English assist you with your upper-division course load and also are helpful in your career. Special fields of interest are accounting, economics, finance, management, and marketing. Flexibility with electives allows you to strengthen your program in special areas.

Teaching methods used in the College of Business and Economics include lectures, laboratories, cases, guest lectures, field trips, and internships. Closed circuit video, telelecture, and other modern teaching technologies supplement class work.

Bureau of Business Research

The Bureau of Business Research is the formal research division of the College of Business and Economics. Various projects and programs are conducted and administered by the bureau, many of which are funded through grant and contract relationships with other organizations, both private and governmental. Basically, the bureau serves three interrelated functions — research, information services, and publication.

One of its missions is to identify research needs and opportunities, with special concern for those related to the economic problems of the Appalachian region. Appropriately, much of the recent grant-supported activity has dealt with three areas of concern to West Virginia — the development of travel and tourism, health care problems, and energy. Along with valuable data on current needs, students are provided with opportunities for training in research methods. Direct access to the West Virginia Network for Educational Telecomputing (WVNET) on Chestnut Ridge Road is provided through a terminal housed within the bureau.

The bureau also serves as a research center through its reference library of books and periodicals on business and economics, and responds continually to requests for statistical and economic information. As a member of the Association for University Business and Economic Research, the bureau receives many of the publications of research organizations at other universities, thus maintaining an up-to-date file of current research in the fields of business and economics.

Two scholarly journals published by the bureau are the *Business Law Review* and the *Journal of Small Business Management*, the latter having an international circulation. Since 1976 the bureau has also published the annual *Bibliography of the Association for University Business and Economic Research*. In addition, the bureau carries out a publication program which includes faculty working papers in both business and economics, and a monograph series known as *West Virginia University Business and Economics Studies*.

Administrative Officers

Jack T. Turner, D.B.A. (Ind. U.), *Dean of College of Business and Economics.*
Joseph Newhouse, M.S. (WVU), *Assistant Dean of College of Business and Economics.*
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Randyl Elkin, Ph.D. (Iowa St. U), *Director, Graduate Industrial Relations Programs.*
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Gail A. Shaw, Ph.D. (U. Mo.), *Chairman, Department of Accounting and Finance.*
Dietrich L. Schaupp, Ph.D. (U. Ky.), *Chairman, Department of Management and Marketing.*

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Randyl Elkin, Ph.D. (Iowa St. U.), *Associate Professor of Economics and Industrial Relations.*
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Philip Mahin, M.B.A. (U. Penn.), *Associate Professor of Marketing.*
Ali H. Mansour, Ph.D. (U. Ga.), *Assistant Professor of Management.*
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Elizabeth Martin, J.D. (WVU), *Instructor in Business Law.*
Wendell G. Marston, M.A. (VPI), *Assistant Professor of Economics.*
Robert S. Maust, C.P.A., M.S. (WVU), *Professor of Accounting.*
Austin Montgomery, Ph.D. (N. Tex. St. U.), *Professor of Marketing.*
James Murdoch, M.B.A. (WVU), *Instructor in Accounting.*
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Daniel Oliver, J.D. (WVU), *Instructor in Business Law.*
John T. Overby, Ph.D. (U. Tex.), *Associate Professor of Accounting.*
Walter Page, Ph.D. (U. Kan.), *Associate Professor of Economics.*
Catherine Palomba, Ph.D. (Iowa St. U.), *Associate Professor of Economics.*
Neil Palomba, Ph.D. (U. Minn.), *Professor of Economics and Industrial Relations.*
Joseph Phalen, M.S. (WVU), *Instructor in Accounting.*
Jack Porter, M.B.A. (WVU), *Adjunct Instructor in Management.*
Forrest W. Price, Ph.D. (U. Wash.), *Associate Professor of Management.*
Suzanne E. Reid, Ph.D. (Duke U.), *Associate Professor of Economics.*
William B. Riley, Jr., Ph.D. (U. Ark.), *Assistant Professor of Finance.*
Dan B. Rinks, B.S. (U. Ala.), *Assistant Professor of Management.*
Evan O. Roberts, Ph.D. (U. Wisc.), *Professor Emeritus.*
James M. Rovelstad, Ph.D. (U. Mich.), *Professor of Marketing.*
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Brooks E. Smith, J.D. (WVU), *Lecturer in Business Law and Management.*
Wil J. Smith, M.A. (U. Wisc.), *Associate Professor of Industrial Relations.*
Charles F. Socher, M.A. (WVU), *Instructor in Economics.*
James C. Summers, Ph.D. (Ohio St. U.), *Associate Professor of Industrial Relations.*
Linda T. Sypolt, J.D. (WVU), *Assistant Professor of Business Law.*
Owen A. Tapper, M.A. (U. Wisc.), *Associate Professor of Industrial Relations.*
James H. Thompson, Ph.D. (U. Pitt.), *Professor of Economics.*
Anthony M. Tuberose, Ph.D. (U. Tex.), *Associate Professor of Finance.*
Ben J. Tuchi, Ph.D. (St. Lou. U.), *Professor of Finance.*
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Royce J. Watts, M.S. (WVU), *Assistant Professor of Economics.*
James E. Wilson, M.B.A. (Memphis St. U.), *Assistant Professor of Accounting.*
Tom S. Witt, Ph.D. (Wash. U., St. Lou.), *Associate Professor of Economics.*
Fred E. Wright, Jr., M.A. (WVU), *Professor of Finance.*
Gregory Yi, Ph.D. (SUNY — Buffalo), *Professor of Economics.*
Frederick A. Zeller, Ph.D. (Ohio St. U.), *Professor of Industrial Relations.*

Admission

High school students interested in professional careers in accounting, economics, finance, management, or marketing should seek admission in the pre-business and economics program in the College of Arts and Sciences. On-campus students or transfer students from other institutions may seek admission into the College of Business and Economics upon completion of 58 or more semester hours.

High school graduates interested in professional programs in business administration and economics must meet the minimum requirements for admission to WVU. Prospective students should file applications with the Dean of Admissions and Records and stipulate the "Pre-Business and Economics Programs."

Additional information concerning admission, registration, fees and expenses, and regulations is in Part 2 of the *Undergraduate Catalog*.

Accreditation

The College of Business and Economics is accredited not only through the approval of WVU by national and regional accrediting agencies, but also through full membership in the American Assembly of Collegiate Schools of Business. This association is the only accrediting agency in the field of professional education for business at the collegiate level.

Second Bachelor's Degree

A student who has received a bachelor's degree from an approved college or university may be eligible to enter the program for a second bachelor's degree in business administration or economics. This program is designed for persons who have already received a bachelor's degree in another field, who now desire to strengthen themselves for careers in business and industry, and for those students who may wish to eliminate deficiencies and enhance their opportunities for graduate study. The required Business and Economics core leading to a second bachelor's degree in Business Administration comprises 42 hours. The required Economics and Business core leading to a second bachelor's degree in Economics comprises 36 hours. A second degree candidate must complete *all* courses in the stipulated Business and Economics core and such other courses as the Dean may prescribe.

A student may complete a portion of the required Business and/or Economics core while earning the first undergraduate degree. However, candidates for the second bachelor's degree must complete a minimum of 30 semester hours of credit in courses in the College of Business and Economics while in residence in the College. Residency may be established only after the student documents receipt of the first bachelor's degree.

Work Taken at Other Institutions

Students who expect to obtain a degree from the College of Business and Economics and who wish to take work at other institutions must have their programs approved by the Dean of the College of Business and Economics before registering at another institution of higher learning. Ordinarily required courses must be taken at WVU.

Requirements for Degrees

Bachelor's Degree

To qualify for either the Bachelor of Science in Business Administration or Bachelor of Science in Economics degrees, the student must have:

1. Earned 128 semester hours of credit with a 2.0 grade-point average (C) on all work attempted at WVU and state colleges under the jurisdiction of the West Virginia Board of Regents. In addition, all students are required to maintain at least a 2.0 average on all work attempted after admission to the College of Business and Economics (not merely WVU).

2. Earned 128 semester hours of credit in subjects other than in Math. 2. A maximum of 6 hours of credit in advanced Military Science (ROTC) or Air Force Aerospace Studies (ROTC) will be allowed toward graduation and is counted as a non-Business and Economics elective.

3. Earned at least 30 hours of credit while enrolled in the College of Business and Economics, and in residence.

4. Satisfied the requirements of the WVU Core Curriculum.

5. Satisfied the course requirements of one of the College of Business and Economics curricula described below.

Undergraduate Curricula

The College of Business and Economics offers two degrees — Bachelor of Science in Business Administration and Bachelor of Science in Economics. Programs leading to these degrees are designed to enable students to obtain a balanced selection of courses in liberal arts, a broad base of study in business and economics, and concentrated work in major areas of interest.

B.S. in Business Administration

The requirements for the B.S. Degree in Business Administration are formulated in four parts: (1) 56 hours outside business and economics; (2) 6 hours of unrestricted courses — in or out of the College of Business and Economics; (3) 30 hours in the common body of knowledge in business and economics; and (4) 36 hours in an area of concentration (accounting, finance, business management, or marketing) and in electives in business and economics with a career emphasis.

Since students interested in business administration matriculate in the College of Arts and Sciences during their freshman and sophomore years and their junior and senior years in the College of Business and Economics, and since several major changes have been made in the curricula, a clarification of effective dates is desirable:

(a) The whole program enumerated in the *Undergraduate Catalog* is effective for students who entered WVU as freshman or transfer students who entered another institution as freshmen in or after August, 1975.

(b) The revised upper-division programs in the *Undergraduate Catalog* enumerated primarily under the "Required College (Business and Economics) Core Courses" and under the "Requirements for Majors" are effective for students who entered the College of Business and Economics (not just WVU) in or after August, 1975.

(c) Students who entered the Colelge of Business and Economics in or after August, 1975, will not be permitted to take any business course or economics

course (used as a required elective) on a Pass-Fail basis, except that business students enrolled in courses numbered 200 (only Special Topics) other than their major area and free economic electives may be taken on a Pass-Fail basis.

(d) Business majors who entered the College of Business and Economics in August, 1977, or later, must earn a 2.0 (C) *average* or better on *all* courses in their major areas of concentration (excludes required courses from other disciplines in Business or Economics).

Non-Business and Non-Economics Core	*Hr*	*Total*
Engl. 1 and 2 — Composition and Rhetoric	6	
P.E. — General Program in Physical Education	2	
Core Group A Courses:		
Engl. 105 — Business Communication	3	
Other Group A Electives	9	
Core Group B Courses:		
Psych. 1 — Introduction to Psychology	3	
Soc. & A. 1 — Introduction to Sociology	3	
Other Group B Electives (Non-economics)	6	
Core Group C Courses (12 or more hours):		
Math. 3 (or 14), 15, 16, 28 or 128*	6-8	
Com. S. 1 — Introduction to Computer Science	4	
Other Group C Electives (other than Stat. 101)	3	
Other Electives — Non-Business and Economics	11	
	56	56
Unrestricted Electives (in or out of the College of Business and Economics)	6	6

All majors in business administration must complete a uniform body of common knowledge in business and economics consisting of 30 credit hours.

Required College Core Courses	*Hr.*	
Acctg. 51 and 52 — Principles	6	
Econ. 54 and 55 — Principles	6	
Econ. 125 — Elementary Business and Economics Statistics	3	
B. Law 111 — Legal Environment	3	
Fin. 111 — Business Finance	3	
Manag. 105 — Contemporary Management	3	
Mrktg. 111 — Marketing	3	
Manag. 225 — Business Policy	3	
	30	30
Courses in Major Field (2nd electives)	36	36
GRAND TOTAL		128

*Select any two of the listed mathematics courses. If a student elects to take 8 hours from those listed, only Com. S. 1 will be necessary (12 hours)

Accounting Majors

Advanced work in accounting provides both specialized knowledge in accounting and financial reporting and an integrated overview of the economic activities of a business entity. Advanced accounting courses prepare students for a variety of positions in accounting, business, and financial management, such as controllers, financial officers, certified public accountants, certified management accountants, general management trainees, internal auditors, cost accountants, tax accountants, public administrative officers, and other executives.

	Hr.
Acctg. 111 and 112 — Intermediate Accounting	6
Acctg. 113 — Advanced Accounting	3
Acctg. 115 — Cost Accounting	3
Acctg. 211 — Accounting Systems, or Acctg. 217 — Auditing Theory	3
Acctg. 213 — Income Tax Accounting	3
B. Law 112 — Commercial Law	3
Econ. 130 — Money and Banking	3
Business and Economics Electives*	12
	—
	36

*Within the 12 credit hours of business and economics electives, the accounting major must complete a minimum of 3 hr. in economics. The remaining 9 business and economics elective hours should be distributed in accounting, other business, and/or economics courses in support of a career objective.

Accounting majors who entered the College of Business and Economics in August, 1977, or later, must earn a grade of C or better in Accounting 111 before proceeding to Accounting 112 and earn a C or better in Accounting 112 before proceeding to Accounting 113. Written exceptions may be allowed by instructors, but only in special circumstances (the student and the College's Student Service Center will be informed in writing).

Accounting majors are urged to properly sequence the accounting courses for maximum benefit. Accounting 111 and Accounting 115 are recommended in the first semester of the junior year followed by Accounting 112 and 211 in the second semester. Seniors are prepared to enroll in Accounting 113, 213, and 200 in the first semester and Accounting 214, 216, and 217 in the second or final semester.

Career Paths in Accounting

Careers in accounting include industrial, public, and governmental accounting. While accounting and potential accounting majors are urged to consult with the faculty relative to the opportunities and the preparation desirable in the several career areas, recommendations or guidelines are listed below in assisting students in the selection of electives in accounting, other business areas, economics and outside courses which will prepare students better for the several career paths and professional examinations in accounting.

Industrial Accounting

The following courses are recommended for selection as electives for students preparing for careers in industrial accounting:

Business and Economics Electives:

- Acctg. 200 — Special Topics.
- Acctg. 211 — Acctg. Systems
- Acctg. 214 — Inc. Tax Acctg. II
- Acctg. 216 — Adv. Managerial Acctg.
- Acctg. 217 — Auditing Theo.
- Fin. 150 — Investments
- Fin. 112 — Finan. Man.
- Fin. 250 — Appl. Secur. Analysis
- Manag. 111 — Operations Man.
- Manag. 112 — Quan. Bus. Methods
- Econ. 211 — Micro Econ. Anal.
- Econ. 160 — Labor Econ.
- Econ. 225 — Appl. Bus. & Econ. Stat.
- Econ. 245 — Govt. and Bus.

Non-Business and Non-Economics Electives:

- Stat. 231 — Sampling Methods
- Engl. 8 — Interm. Comp.
- Engl. 108 — Adv. Comp.
- I.E. 20 — Fund of Ind. Engr.
- Com. S. 2 — Lang. Concepts

Public Accounting

The following courses are recommended for selection as electives for students preparing for careers in public accounting:

Business and Economics Electives:

Acctg. 200 — Special Topics
Acctg. 211 — Accounting Systems
Acctg. 214 — Income Tax Acctg. II
Acctg. 217 — Auditing Theory
Acctg. 218 — Auditing Practice
Fin. 150 — Investments
Fin. 250 — Appl. Sec. Anal.
Fin. 115 — General Insurance
Manag. 111 — Operations Management
Manag. 112 — Quan. Bus. Methods
Econ. 211 — Micro Econ. Anal.
Econ. 225 — Appl. Bus. & Econ. Stat.
Econ. 245 — Govt. and Bus.

Non-Business and Non-Economics Electives:

Engl. 8 — Interm. Composition
Engl. 108 — Adv. Composition
Com. S. 2 — Computer Lang. Conc.
Stat. 231 — Sampling Methods

Governmental Accounting

The following courses are recommended for selection as electives for students preparing for careers in governmental accounting:

Acctg. 200 — Special Topics.
Acctg. 211 — Accounting Systems
Acctg. 214 — Income Tax Acctg. II
Acctg. 216 — Adv. Mgr. Acctg.
Acctg. 217 — Auditing Theory
Fin. 150 — Investments
Manag. 112 — Quan. Bus. Methods
Econ. 226 — Advanced Statistics
Econ. 241 — Public Finance
Econ. 245 — Govt. and Bus.

Non-Business and Non-Economics Electives:

Com. S. 30 — Computer Lang. Concepts
Stat. 231 — Sampling Methods
Engl. 8 — Intermed. Composition
Engl. 108 — Adv. Composition

Professional Five-Year Program in Accounting

A bachelor's degree is the minimum preparation necessary for accounting careers and professional examinations. Students interested in broader professional education for the CPA (Certified Public Accountant), CMA (Certified Managerial Accountant), or CIA (Certified Internal Auditor) examinations and for the professional practice of accounting should consider five years of college-level work. Students meeting the requirements listed below would receive a Bachelor of Science in Business Administration degree (major in Accounting) at the end of the fourth year and a graduate degree at the end of the fifth year. Admission to the graduate program at the end of the fourth year is not automatic and requires a separate application to the Director of Graduate Programs in Business, College of Business and Economics.

The program requirements and recommended electives are as follows for the first four years leading to the bachelor's degree:

	Hr.
Non-Business and Non-Economics Courses	56
Unrestricted electives	6
Required College Core	30
Accounting and other Business and Economics requirements	
Acctg. 111 and 112 — Intermediate Accounting	6
Acctg. 113 — Advanced Accounting	3
Acctg. 115 — Cost Accounting	3
Acctg. 211 — Accounting Systems *or* Acctg. 217 — Auditing Theory	3
Acctg. 213 — Income Tax Accounting[1]	3
B. Law 112 — Commercial Law	3
Econ. 130 — Money and Banking	3
Business and Economics electives[1]	12
	36 hr.
	128

The specific courses and accounting program requirements for graduate degrees are in the process of being finalized. For information, contact the Director of Graduate Programs in Business, WVU College of Business and Economics, Morgantown, WV 26506

Required and elective courses in the fifth-year accounting program, offered during 1978-79 were: Accounting Theory, Controllership, Evolution of Accounting Thought, Managerial Controls, Seminar in Accounting, Advanced Auditing, and Applied Information Systems

Business Management Majors

Students interested in personnel management, industrial relations, operations management, and in administrative positions involving analysis and decision making should enroll in this curriculum.

A student majoring in Business Management must arrange a program around one of five options: administration and organizational behavior, personnel management, operations management, management science, or small business management.

Administration and Organizational Behavior Option

The option in organization behavior and administration emphasizes a study of the supervisor-subordinate relationship as it operates in the environment of an organization. Students are helped to develop managerial skills in leadership, motivation, communications, decision making, and policy formulation. Simultaneously, students learn ways in which these skills can be employed in organizations with established goals, technology and structure.

Individuals desiring a career in administration can select course work which will prepare them in such areas as are listed below:

Industrial Relations — Typically positions in industrial relations are with labor-management relations, and involve such areas as collective bargaining, labor law, negotiating, and writing the union contract, handling grievances and arbitration, and dealing with absenteeism and drug problems.

General Management — This career path offers opportunities in lower or middle management positions which involves the administration of a major organizational activity of a business firm.

Organizational Development — Career opportunities typically deal with methods of organization improvement in such areas as the application of management by objectives, the tools and techniques of organizational change, and processes associated with integrating employee desires with organizational goals.

Planning — Career paths in this area include positions involving the development of plans for the acquisition and deployment of human, financial, and material resources available to the firm.

Administration and Organizational Behavior Program

	Hr.
Manag. 111 — Operations Management, *or*	
Manag. 112 — Quantitative Business Methods	3
Acctg. 116 — Managerial Accounting	3
Manag. 205 — Individual and the Organization	3
Manag. 206 — Organizational Theory and Analysis, *or*	
Econ. 262 — Collective Bargaining	3
Manag. 216 — Personnel Management	3
Business and Economics Electives[2]	21
Total	36

Business management majors following this option are urged to consult with faculty and follow the recommendations below in the selection of business, economics, and outside electives.

Recommended Business and Economics Electives:

Manag. 200 — Special Topics	B. Law 200 — Special Topics
Manag. 213 — Independent Study	Acctg. 216 — Adv. Managerial Acctg.

Recommended Outside Electives:

Pol. S. 140 — Intro. to Pub. Ad.	Soc. & A. 202 — Behavioral Sociology
Psych. 101 — Ldship and Hum. Relations	Soc. & A. 233 — Industrial Sociology
Psych. 151 — Intro. Soc. Psy.	Spch. 221 — Persuasion

Students should take a minimum of two of the foregoing from either their unrestricted electives, Group A or B requirements, or from their other free outside electives.

Personnel Management Option

Graduates with personnel training may be assigned to tasks dealing with employee programs and benefits, employee services, management training and education, manpower planning and development, recruiting, interviewing, selecting and orienting new employees, job evaluation and wage-salary administration.

Personnel Management Program

	Hr.
Manag. 111 — Operations Management	3
Manag. 217 — Personnel and Compensation	3
Manag. 201 — Business Information Systems	4
Manag. 205 — Individual and the Organization	3
Manag. 206 — Organizational Theory and Analysis	3
Manag. 216 — Personnel Management	3
B. Law 200 — Personnel Relations and the Law	3
Econ. 160 — Labor Economics	3
Econ. 262 — Collective Bargaining	3
Business and Economics Electives*	8
Total	36

*Recommended Elective: Manag. 200 — Focal Points in Management.

Recommended Outside Electives:

Business management majors electing the personnel management option are particularly urged to choose a minimum of two of the courses listed below from either their Group A or B requirements, unrestricted electives, or free outside electives (as appropriate).

I.E. 222 — Job Eval. and Wage Inc.	Psych. 201 — Personnel Psy.
I.E. 280 — Ind. Eng'g. Prob.	Soc. & A. 233 — Industrial Sociology
Psych. 101 — Ldship and Hum. Rel.	Spch. 221 — Persuasion

Operations Management Option

Students interested in "quantitative techniques, and their application to managerial decisions" should enroll in this curriculum. The most likely career paths for students selecting "operations management" include staff positions in "production or inventory planning and control" and "line position in production management."

Operations Management Program

	Hr.
Manag. 111 — Operations Management	3
Manag. 112 — Quantitative Business Methods	3
Acctg. 116 — Managerial Accounting	3
Manag. 205 — Individual and the Organization	3
Manag. 210 — Business Decision Making Under Uncertainty	3
Manag. 220 — Deterministic Decision Analysis	3
Business and Economics Electives*	18
Total	36

*Within the 21 (or 18) credit hours of business and economics electives, the business management major, except management science, must complete 6 hours in economics. The remaining 15 (or 12) hours should be distributed in management, other business and/or economics courses in support of career objectives.

Students selecting this option should seek advice in curriculum planning from the management faculty, particularly if possible, during their freshman or sophomore years. Advice and guidance in the selection of both inside and outside elective courses will be valuable in lending support to careers in operations and management.

Management Science Option

Students with strong backgrounds in mathematics and/or statistics and those who desire to pursue the "application of quantitative techniques to managerial decisions" in considerable depth should enroll in this curriculum. Students selecting the "management science option" are trained for staff positions in management science, operations research, systems analysis, organizational planning, and the industrial application of computer science, mathematics, and statistics.

Management Science Program

	Hr.
Manag. 111 — Operations Management	3
Manag. 112 — Quantitative Business Methods	3
Acctg. 116 — Managerial Accounting	3
Manag. 201 — Business Information Systems	4
Manag. 205 — Individual and the Organization	3
Manag. 210 — Business Decision Making Under Uncertainty	3
Manag. 220 — Deterministic Decision Analysis	3
Econ. 225 — Applied Business and Economics Statistics	3
Business and Economics Electives*	11
Com. S. 60 — Introduction to COBOL	1
Com. S. 61 — Intermediate COBOL	1
Com. S. 21 — Intermediate FORTRAN	1
Total	39

*Within the 11 hours business or economics electives the management science major must complete 3 hours in economics. The remaining 8 hours should be distributed in management, other business, and/or economics courses in support of career objectives.

A careful examination of the 128-hour degree requirement reveals that a 20-credit-hour block of "outside elective" courses may be used to support the

required management science option (20 hours: 3 hr. from non-identified Group C, 11 hr. from the free outside electives, and 6 hr. from the unrestricted area).

Students interested in the management science program should consult with the management faculty as early as possible in their college careers, preferably at the freshman or sophomore stage. For your guidance, however, a list of the more vital outside support courses follows:

Recommended Outside Electives:

Math. 4 — Plane Trig.
Math. 15 — Calculus I
Math. 16 — Calculus II
Math. 17 — Appl. Math. I
Math. 18 — Appl. Math. II
Math. 51 — Multivar, Calc.
Math. 113 — Diff. Equas.
Math. 128 — Intro. Calc. or
Math. 141, 161, 163, 168, 181, 215, 239, 241, 256, 263 and 269.
Com. S. 2 — Lang. Conc.
Com. S. 220 — Numerical Anal.
Com. S. 223 — Appl. Matrix Alg. *or*
Com. S. 230, 240, 241, 248, 260, 291, and 301.
I.E. 283 — Info. Retrieval
Stat. 215 — Stat. Comp. Tech's.
Stat. 223 — Appl. Matr. Algebra
Stat. 231 — Sampling Meth.
Stat. 261 — Stat. and Prob.
Stat. 262 — Stat. and Prob.
Stat. 311, 312 — Stat. Meth.
Stat. 333 — Nonparametric Stat.
Stat. 341 — Multivar. Meth.
Stat. 351 — App. Regres. Anal.
Stat. 361, 362 — Theo. of Stat.

Small Business Program

The option in small business emphasizes a study of the entrepreneur and the myriad roles in which he must function. Concepts and skills are developed in this option for application to the unique problems and situations of the small businessman. Because of the many "hats" the entrepreneur must wear, individuals who will have an emphasis in small business will receive a "generalist" background and will be able to create and direct business organizations to produce and market new products or services.

	Hr.
Manag. 111 — Operations Management	3
B. Law 112 — Commercial Law	3
Fin. 115 — General Insurance	3
Acctg. 116 — Managerial Accounting	3
Mrktg. 120 — Promotion Management	3
Manag. 160 — Management of Small Business	3
Manag. 230 — Entrepreneurship	3
Manag. 260 — Practicum in Small Business	3
Manag. 216 — Personnel Management	3
Business and Economics Electives*	9
Total	36

*Within the 9 hours business or economics electives, the small business major must complete 6 hours in economics.

Finance Majors

Students contemplating careers in financial analysis with private or public enterprises, in insurance or real estate firms, in commercial banking or investment banking, in brokerage and/or other financial institutions should enroll in this curriculum.

	Hr.
Fin. 112 — Financial Management	3
Acctg. 116 — Managerial Accounting	3
Select one of the two options listed below	9

Finance and Investment Option
- Acctg. 111 — Inter. Acctg.
- Fin. 150 — Investments
- Fin. 151 — Finan. Inst.
- Fin. 250 — Appl. Sec. Anal.
- Fin. 251 — Bank Mgt.
- Fin. 200 — Special Topics

Insurance and Real Estate Option
- Fin. 115 — Gen. Ins.
- Fin. 120 — Life Ins.
- Fin. 161 — Real Estate*
- Fin. 216 — Risk Mgt.
- Fin. 261 — R. Est. Appr.
- Fin. 262 — R. Est. Fin.
- Fin. 263 — R. Est. Ld. Dev.
- Econ. 265 — Soc. Ins.
- Fin. 200 — Special Topics

Business and Economic Electives**	21
	36

*Fin. 161 should be taken in the first semester of the junior year by students selecting the real estate option in order to complete the sequence of real estate offerings.

**Within the 21 credit hours of business and economic electives, the finance major must complete a minimum of 6 hours in economics from the following list: Econ. 130, 211, 212, 241, 245, 255. The remaining 15 hours of business and economics elective hours should be distributed in finance, other business, and/or economics courses in support of career objectives.

Career options in finance include positions in various industrial and public enterprises, in real estate, and numerous financial institutions (commercial or investment banking, brokerage, investment companies, and insurance companies). Finance majors should consult with the finance faculty relative to the several career paths *with particular emphasis on the selection of elective courses both in and out of the College.*

Marketing Majors

Students considering careers in marketing ranging from sales to research, from retailing to manufacturing, and from the relatively small and local firm to the multinational corporate giant should enroll in this curriculum.

	Hr.
Mrktg. 113 — Marketing Research	3
Mrktg. 211 — Marketing Management	3
Other Required Marketing Courses	9
Business and Economics Electives*	21

*Within the 21 credit hours of business and economics electives, the marketing major must complete 6 hours in economics. The remaining 15 hours should be distributed in marketing, other business, and/or economics courses in support of career objectives.

Marketing Career Guidelines

While marketing majors are free to select any combination of marketing elective courses, economic electives, other business electives, and outside courses to meet program and degree requirements, students are urged to consult with faculty and consider the guidelines and recommendations enumerated below in the several possible career paths in marketing.

Sales, Merchandising or Retailing Career Paths

Recommended Marketing Electives:
- Mrktg. 115 — Chan. of Distr.
- Mrktg. 120 — Promo. Manag.
- Mrktg. 130 — Prod. & Price Pol.
- Mrktg. 201 — Focal Pts. Mrktg.
- Mrktg. 203 — Sales Manag.
- Mrktg. 205 — Consumer Beh.
- Mrktg. 210 — Intermed. Mrktg.

Recommended Economics Electives:
Econ. 245 — Government and Business
Recommended Outside Electives:
Eng'g. 111 — Imp. of Tech. on Soc.
Psych. 151 — Intro. to Soc. Psych.
Spch. 133 — Interpersonal Comm.
Journ. 114 — Retail Adv.
Journ. 251 — Direct Mail Adv.
Spch. 221 — Persuasion

Marketing Research Career Path
Recommended Marketing Electives:
Mrktg. 115 — Channels of Dist.
Mrktg. 200 — Prob. Mkt. Res.
Mrktg. 201 — Focus Pts. in Mkt.
Mrktg. 205 — Consumer Beh.
Mrktg. 210 — Interm. Markets
Recommended Business Electives:
Manag. 111 — Oprtns. Mgt.
Manag. 112 — Quan. Bus. Methods
Manag. 205 — Individual & Orgn.
Acctg. 116 — Man. Acctg.
Recommended Economics Elective:
Econ. 245 — Government and Business
Recommended Outside Electives:
Math. 14 and 15 — Calculus
Stat. 201 — Interm. Stat. Meth.
Stat. 213 — Bas. Stat. Anal.
Stat. 231 — Sampling Meth.
Psych. 262 — Intro. Clin. Assess.
Psych. 353 — Attitud. & Soc. Chg.
Soc. & A. 101 — Prin. of Soc.
Eng'g. 111 — Impt. Tech. Soc.
Psych. 151 — Intro. Soc. Psych.

Distribution/Purchasing Career Paths
Recommended Marketing Electives:
Mrktg. 115 — Chann. of Distr.
Mrktg. 203 — Sales Mgt.
Mrktg. 200 — Prob. Mkt. Res.
Mrktg. 201 — Foc. Pts. Mkt.
Mrktg. 205 — Consumer Beh.
Mrktg. 210 — Interm. Mkts.
Recommended Business Electives:
Manag. 111 — Oprtns. Mgt.
Manag. 112 — Quan. Bus. Methods
Manag. 205 — Indiv. & Orgn.
Acctg. 116 — Man. Acctg.
Recommended Economics Electives:
Econ. 245 — Bus. and Govt.
Econ. 246 — Transportation
Recommended Outside Electives:
I.E. 220 — Ind. Eng. & Org.
Journ. 112 — Ind. & Tech. Journ.
Spch. 109 — Comm. Orgn.
Eng'g. 111 — Impt. Tech. on Soc.
Psych. 151 — Intro. Soc. Psych.

Product Management Career Path
Recommended Marketing Electives:
Mrktg. 115 — Chan. of Distr.
Mrktg. 120 — Promo. Man.
Mrktg. 200 — Prob. Mkt. Res.
Mrktg. 200 — Sales Mgt.
Mrktg. 201 — Focal Pts. in Mkt.
Mrktg. 205 — Consumer Beh.
Mrktg. 210 — Interm. Mkts.
Recommended Business Electives:
Manag. 111 — Oprtns. Mgt.
Mrktg. 112 — Quan. Bus. Methods
Mrktg. 205 — Ind. and Org.
Acctg. 116 — Man. Acctg.
Recommended Economics Electives:
Econ. 245 — Bus. and Govt.
Econ. 246 — Trans. & Econ.
Recommended Outside Electives:
Journ. 112 — Ind. & Tech. Journ
Spch. 109 — Comm. Org. & Inst.
Soc. & A. 101 — Princ. of Soc.

Advertising Career Path
Recommended Marketing Electives:
Mrktg. 115 — Chan. of Distr.
Mrktg. 120 — Promo. Mgt.
Mrktg. 201 — Foc. Pts. Mrktg.
Mrktg. 205 — Consumer Beh.
Mrktg. 210 — Interm. Mkts.
Mrktg. 200 — Prod. & Price Pol.

Recommended Business Electives:
Manag. 205 — Ind. Org.
Recommended Outside Electives:
Journ. 113 — Prin. Adv.
Journ. 115 — Adv. Copy, Layout
Journ. 139 — Adv. Man. Promo.
Journ. 203 — Med. Man. & Prom.
Journ. 251 — Dir. Mail Adv.
Spch. 221 — Persuasion
Psych. 151 — Intro. Soc. Psychol.

B.S. in Economics

Knowledge of economics is essential for understanding a wide range of domestic and international issues. In economics the use of resources and the processes involved in production, distribution, and consumption of goods and services in the American and other economic systems are systematically studied. Undergraduate work in economics includes analysis of how the economy has developed, how it is organized, and how it functions. It involves analysis of the components of the economy such as households, businesses, and governments, as well as the pricing, development, and use of resources, and regional and community development.

The Department of Economics offers courses designed to prepare the student for work in government and industry, for additional study in economics at the graduate level, and for professional studies in areas such as law, business administration, and public administration.

Majors in economics must complete 62 credit hours in non-economics and non-business courses consisting of University Core Curriculum courses and electives (18 hours must be at the upper-division — 100 and 200 level).

Non-Business and Economics

	Hr.	*Total*
Engl. 1 and 2 — Composition and Rhetoric	6	
Core Group A Courses	12	
Core Group B Courses (Other than Economics)	6	
Core Group C Courses		
Math. 3, 15, 16, 28 or 128	6-8	
(Student must take at least 2 courses — Math. 3, 15, 16, 28, or 128.)		
Other Group C electives	4-6	
Physical Education — General Program	2	
Other Electives — Non-Business and Economics	21	
Total Non-Business and Economics	62	62
Unrestricted Electives	6	6

B.S. in Economics

Required College Core Courses:		*Hr.*
Acctg. 51 and 52 — Principles	6	
Econ. 54 and 55 — Principles	6	
Econ. 125 — Elementary Business and Economics Statistics	3	
Econ. 211 — Micro Economic Analysis	3	
Econ. 212 — Macro Economic Analysis	3	
Econ. 216 — History of Economic Thought	3	
	24	24

A minimum of 27 upper-division hours in economics is required of all majors, including required courses. Students are also expected to fulfill concentration and distribution requirements.

College Electives:	*Hr.*	
Economics	15	
Business	9	
Economics or Business	12	36
Distribution: At least one course (3 credit hours) from three of the four areas of concentration.		
Concentration: At least three courses (9 credit hours) in one area of concentration.		
GRAND TOTAL		128

Any student planning to pursue graduate work in economics should take at least one semester of calculus.

Areas of Concentration

*Quantitative Analysis**
- Econ. 220 — Introduction to Mathematical Economics
- Econ. 225 — Appl. Bus. and Econ. Stat.
- Econ. 226 — Advanced Statistics
- Econ. 200 — Special Topics**

Public Sector and Private Enterprise
- Econ. 130 — Money and Banking
- Econ. 241 — Public Finance
- Econ. 245 — Government and Business
- Econ. 246 — Transportation
- Econ. 200 — Special Topics**

Human Resources
- Econ. 160 — Labor Economics
- Econ. 260 — Manpower Economics
- Econ. 262 — Collective Bargaining
- Econ. 263 — Economics of Wages
- Econ. 265 — Economics of Social Security
- Econ. 200 — Special Topics**

Regional, International and Development
- Econ. 110 — Comparative Economic Systems
- Econ. 213 — Economics Development
- Econ. 250 — International Economics
- Econ. 255 — Regional Economics
- Econ. 257 — Urban Economics
- Econ. 270 — Growth of the American Economy
- Econ. 200 — Special Topics**

*Students wishing to concentrate in quantitative analysis may supplement the areas with courses approved by the adviser in mathematics and/or statistics. Students must still take a minimum 15 hr. of electives in economics.

**The Special Topics course must be selected from the relevant area of concentration. Does not preclude students from taking additional courses (max. of 9 hr.) in the several 200 series of Special Topics courses.

Pre-Business and Pre-Economics Programs

Students must observe the University Core Curriculum requirements in terms of distribution and number of credit hours being mindful that certain core courses are cited specifically. During the first two years of residence in the University, students should complete the major portion or all of the University Core Curriculum.

While the pre-business program and the pre-economics program are similar, differences do exist. However, students do not suffer materially with a program change.

Pre-Business Program

Students who plan to pursue one of the areas in business administration should complete 12 hours in Group A approved courses, including English 105; 12 hours of Group B approved courses, including Psych. 1 and S.A. 1; and 13 hours of Group C approved courses, including Math. 3, Math. 28 and C.S. 1.

Students must have completed or be taking Econ. 125 (Statistics) before any other 100-level course in the business and economics "core" can be taken. In addition, such students are restricted to the 100-level business and economics "core" courses and certain specified exceptions until Econ. 125 is completed successfully.

FRESHMAN YEAR				SOPHOMORE YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Engl. 1	3	Engl. 2	3	Acctg. 51	3	Acctg. 52	3
Econ. 54	3	Econ. 55	3	Com. S. 5	4	Engl. 105	3
Psych. 1	3	Math. 28	3	Core A	6	Econ. 125	3
Math. 3	3	Soc. & A. 1	3	Core B	3	Core B	3
P.E. 1	3	P.E. 2	1			Elective —	
Core C	3	Core A	3			Outside	3
	16		16		15		16

Pre-Economics Program

Students who plan to pursue the B.S. in Economics must complete 12 hours of Core A courses of their choice; 6 hours of Core B of courses of their choice other than in economics; and 12 hours of Core C courses, including a minimum of 6 hours of mathematics (from the following: Math. 3 (or 14), 15, 16, 28 or 128).

Students majoring in economics are expected to have completed (or be taking) Econ. 125 before any other 100-200 level business or economics course can be taken.

FRESHMAN YEAR				SOPHOMORE YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Engl. 1	3	Engl. 2	3	Acctg. 51	3	Acctg. 52	3
Econ. 54	3	Econ. 55	3	Econ. 125	3	Core A	3
Math. 3 (or 14), 15,		Math. 3 (or 14), 15,		Core A	3	Core B	3
16, 28 or 128*	3-4	16, 28 or 128*	3-4	Core B	3	Elective —	
P.E. 1	1	P.E. 2	1	Elective —		Outside	6
Core A	3	Core A	3	Outside	3		
Core C	3	Core C	3				
	16-17		16-17		15		15

*Student must take at least two of the courses listed (Math. 3, 15, 16, 28, 128.)

B.S. in Business Administration Programs

ACCOUNTING

JUNIOR YEAR				SENIOR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Acctg. 111	3	Acctg. 112	3	Acctg. 113	3	Acctg. 217*	3
Acctg. 115	3	Acctg. 211*	3	Acctg. 213	3	Manag. 225	3
B. Law 111	3	B. Law 112	3	Elective — Economics	3	Elective — Bus. & Econ.	3
Manag. 105	3	Fin. 111	3	Elective — Bus. or Econ.	3	Elective — Outside	3
Mrktg. 111	3	Econ. 130	3	Elective — Outside	3	Elective — Unrestricted	3
		Elective — Outside		Elective — Unrestricted	3		
	15		17		18		15

*While Acctg. 211 *or* Acctg. 217 is required, majors interested in professional accounting examinations or professional positions are urged to select both courses.

BUSINESS MANAGEMENT

Administration and Organizational Behavior Option

JUNIOR YEAR				SENIOR YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Manag. 105	3	Acctg. 116	3	Manag. 216	3	Manag. 225	3
B. Law 111	3	Manag. 111 *or* Mgt. 112	3	Manag. 206 *or* Econ. 262	3	Electives — Bus. or Econ.	6
Mrktg. 111	3	Manag. 205	3	Electives — Outside	3	Electives — Unrestricted	6
Fin. 111	3	Electives — Outside	3	Electives — Bus. or Econ.	6		
Electives — Economics	3	Electives — Bus. or Econ.	6				
Electives — Outside	2						
	17		18		15		15

Personnel Management Option

JUNIOR YEAR				SENIOR YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Manag. 105	3	Manag. 216	3	Manag. 201	4	Manag. 225	3
B. Law 111	3	Manag. 111	3	Manag. 206	3	Manag. 217	3
Manag. 111	3	Manag. 205	3	B. Law 200 Pers. Rel. & Law	3	Electives — Unrestricted	6
Fin. 111	3	Electives — Bus. or Econ.	6	Econ. 262	3	Electives — Outside	3
Econ. 160	3	Electives — Outside	3	Electives — Bus. or Econ*	2		
Electives — Outside	2						
	17		18		15		15

*Manag. 200 — Focal Points in Management — recommended elective.

Operations Management Option

JUNIOR YEAR				SENIOR YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Manag. 105	3	Manag. 112	3	Manag. 210	3	Manag. 225	3
Manag. 111	3	Fin. 111	3	Electives —		Manag. 220	3
B. Law 111	3	Acctg. 116	3	Outside	3	Electives —	
Mrktg. 111	3	Manag. 205	3	Electives —		Bus. or Econ.	3
Electives —		Electives —		Economics	3	Electives —	
Economics	3	Outside	2	Electives —		Unrestricted	6
Electives —		Electives —		Bus. or Econ.	6		
Outside	3	Bus. or Econ.	3				
	18		17		15		15

Management Science Option

JUNIOR YEAR				SENIOR YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Manag. 105	3	Mang. 111	3	Manag. 210	3	Manag. 225	3
B. Law 111	3	Acctg. 116	3	Manag. 201	4	Manag. 220	3
Fin. 111	3	Manag. 205	3	Econ. 225	3	Electives —	
Manag. 111	3	Electives —		Electives —		Bus. or Econ.	3
Com. S. 60	1	Bus. or Econ.	5	Outside	5	Electives —	
Com. S. 61	1	Manag. 112	3	Com. S. 21	1	Unrestricted	6
Electives —							
Econ.	3						
	17		17		16		15

Small Business Option

JUNIOR YEAR				SENIOR YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
B. Law 111	3	Manag. 160	3	Manag. 230	3	Manag. 225	3
Fin. 111	3	Manag. 111	3	Fin. 115	3	Manag. 260	3
Manag. 105	3	Acctg. 116	3	Manag. 216	3	Electives —	
Manag. 111	3	B. Law 112	3	Mrktg. 120	3	Outside	3
Electives —		Electives —		Electives —		Electives —	
Econ.	3	Bus. or Econ.	3	Econ.	3	Unrestricted	6
Electives —		Electives —					
Outside	2	Outside	3				
	17		18		15		15

FINANCE

JUNIOR YEAR				SENIOR YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Manag. 105	3	Acctg. 116	3	Fin. Option	3	Manag. 225	3
Fin. 111	3	Fin. 112	3	Electives —		Fin. Option	3
B. Law 111	3	Fin. Option	3	Economics	3	Electives —	
Mrktg. 111	3	Electives —		Electives —		Economics	3
Electives —		Outside	2	Outside	3	Electives —	
Business	3	Electives —		Electives —		Unrestricted	6
Electives —		Bus. or Econ.	6	Bus. or Econ.	6		
Outside	3						
	18		17		15		15

MARKETING

JUNIOR YEAR				SENIOR YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Manag. 105	3	Mrktg. 113	3	Mrktg. Required	6	Mrktg. 211	3
Mrktg. 111	3	Mrktg. Required	3	Electives —		Manag. 225	3
B. Law 111	3	Electives —		Outside	3	Electives —	
Fin. 111	3	Outside	2	Electives —		Bus. or Econ.	3
Electives —		Electives —		Bus. or Econ.	6	Electives —	
Economics	3	Economics	3			Unrestricted	6
Electives —		Electives —					
Outside	3	Bus. or Econ.	6				
	18		17		15		15

*Fin. 161 should be taken in the first semester of the junior year by students selecting the real estate option in order to complete the sequence of real estate offerings.

B.S. in Economics Program

The economics program is designed for those who wish to emphasize economics in their education for a business career, undertake graduate work for an advanced degree in this field, or for government service.

The student must earn at least 60 hours in upper-division courses (numbered 100 or higher). The apparent excess requirement of 6 hours (total 66 hours indicated under each program) provides for the completion of the University Core Curriculum program, which may be at the lower-division (courses numbered 1 to 99) or upper-division levels. However, the student must take a minimum of 18 hours of upper-division, non-business and economics electives in the economics program.

JUNIOR YEAR				SENIOR YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*		*Second Sem.*	*Hr.*
Econ. 211	3	Econ. 212	3	Electives — Bus.	3	Econ. 216	3
Electives — Bus.	3	Electives — Bus.	3	Electives — Econ.	6	Electives — Bus.	
Electives — Econ.	3	Electives — Econ.	6	Electives — Bus.		or Econ.	6
Electives —		Electives —		or Econ.	3	Electives —	
Outside	9	Outside	3	Electives —		Unrestricted	6
		Electives —		Outside	3		
		Bus. & Econ.	3				
	18		18		15		15

Courses of Instruction

Accounting (Acctg.)

51. *Principles of Accounting.* I, II. 3 hr. PR: Sophomore standing. The accounting cycles from business transactions through financial statement presentation; the use of financial records for reporting data to management and external agencies.

52. *Principles of Accounting.* I, II. 3 hr. PR: Acctg. 51. Utilization of accounting information for purposes of managerial control and decision making; cost concepts, profit and financial budgeting, analysis of financial statements.

111. *Intermediate Accounting.* I. 3 hr. PR: Acctg. 52. Analysis of accounting theory and practice as applied to business firms; assets valuation, liabilities, income determination.

112. *Intermediate Accounting.* I or II. 3 hr. PR: Grade of C or better in Acctg. 111 or written consent. Combination of Acctg. 111.

113. *Advanced Accounting.* I or II. 3 hr. PR: Grade of C or better in Acctg. 112 or written consent. Accounting for partnerships, consolidations, branches, foreign exchanges, and governmental (nor-for-profit) entities.

115. *Cost Accounting.* I, II. 3 hr. PR: Acctg. 52. Fundamentals of cost determination with emphasis on the significance of cost data and their interpretation; process, job-order, and standard costs.

116. *Managerial Accounting.* II. 3 hr. PR: Acctg. 52. For non-accounting majors. *(No credit available to those having credit for Acctg. 115.)* Analysis of internal accounting practices with emphasis on use of data for performance evaluation, control, motivation through accounting systems, and decision-making.

200. *Special Topics.* I, II, S. 1-4 hr. PR: Acctg. 112 or consent. Special topics relevant to accounting. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward bachelor's and master's degrees.

211. *Accounting Systems.* I. 3 hr. PR: Com. S. 1, Acctg. 115 or 116. Adaptation of accounting procedures to demands of firms. Emphasis on use of quantitative tools, use of computers in accounting systems concept, and human behavioral implications of accounting.

213. *Income Tax Accounting.* I. 3 hr. PR: Acctg. 111 or 115 or 116 or consent. Tax laws and the investment and business decisions they affect. Taxes are presented in meaningful relationships in order to form a general pattern of knowledge that is easier understood.

214. *Income Tax Accounting.* II. 3 hr. PR: Acctg. 111 or 115 or 116 or consent. Emphasis on income tax practice as developed from the Internal Revenue Code, regulations, rulings and court decisions. Cases and problems covering individuals, partnerships, corporations, and estate and gift returns.

216. *Advanced Managerial Accounting.* II. 3 hr. PR: Acctg. 115 or Acctg. 116. Advanced work in application of cost theory and procedures to cases and problems which emphasize the managerial use of cost information.

217. *Auditing Theory.* I or II, 3 hr. PR: Acctg. 113 or consent. Auditing fundamentals; objectives, ethics, statistical samplings, standards and procedures. Emphasis on FASB and SAS disclosures.

218. *Auditing Practice.* I or II. 3 hr. PR: Consent. Application of auditing theory and procedures, with emphasis on decisions which invoke judgment and are important in independent audits; audit working papers and reports; case studies.

224. *Advanced Accounting Problems.* I or II. 3 hr. PR: Minimum of 18 hr. in accounting with an average grade of B or higher. Analysis and solution of representative C.P.A. problems.

230. *Advanced Accounting Theory.* I or II. 3 hr. PR: Acctg. 112, 115, and consent. Critical analysis of accounting concepts and standards with emphasis on their origin, development, and significance.

299. *Independent Study.* I, II, S. 1-3 hr. PR: Consent. Students will develop and complete a program of specialized studies under the supervision of a cooperating instructor.

Business Law (B. Law)

111. *Legal Environment of Business.* I, II. 3 hr. The nature of law and the judicial system. The relationship of law, ethics, and cultural values to business enterprise. Substantive law of contracts, sales, and credit transactions and the social and economic consequences of court decisions.

112. *Commercial Law.* I, II. 3 hr. PR: B. Law 111. Substantive law of agency, partnerships, corporations, negotiable instruments, and property and their social and economic functions.

200. *Special Topics.* I, II, S. 1-4 hr. PR: B. Law 112 or consent. Special topics relevant to business law. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward bachelor's and master's degrees.

Economics (Econ.)

51. *The Economic System.* I, II. 3 hr. Analysis of the economic system. The pricing system, monetary system, determination of national income, and employment.

52. *Contemporary Economic Issues.* I, II. 3 hr. PR: Econ. 51. Analysis of current problems relating to the business system, government and the economy, natural and human resources.

54. *Principles of Economics.* I, II. 3 hr. Elementary micro economic analysis. *(Not open to students who have taken Econ. 51 and 52 [without permission].)*

55. *Principles of Economics.* I, II. 3 hr. PR: Econ. 54. Elementary macro economic analysis. *(Not open to students who have taken Econ. 51 and 52 [without permission].)*

110. *Comparative Economic Systems.* I or II. 3 hr. PR: Econ. 52 or 55. Structure and processes of existing economic systems throughout the world including review of basic principles of free enterprise, socialistic, communistic, and fascistic societies. Comprehensive analysis based on current and recent experiments in these economies.

125. *Elementary Business and Economic Statics.* I, II, S. 3 hr. PR: Grade of C or better in either Math. 3 or Math. 14 or consent. Basic concepts of statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression and correlation with emphasis on business and economic examples. *(Equivalent to Stat. 101.)*

130. *Money and Banking.* I, II. 3 hr. PR: Econ. 52 or 55. Our system of monetary and banking arrangements, viewed in relation to functioning of the economic system as a whole.

160. *Labor Economics.* I, II. 3 hr. PR: Econ. 52 or 53. Introduction to labor economics and labor personnel practices, and labor law.

200. *Special Topics.* I, II, S. 1-4 hr. PR: Econ. 52 or 55, or consent. Special topics relevant to economics. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward bachelor's and master's degrees.

205. *Current Economic Problems.* S. 3 hr. PR: Econ. 52, 55, or consent. For students in education only. Acquaints public school teachers with reliable source material in economics in studying current economic problems.

211. *Micro Economic Analysis.* I or II. 3 hr. PR: Econ. 52 or 55. Price and output determination and resource allocation in the firm under various competitive conditions.

212. *Macro Economic Analysis.* I or II. 3 hr. PR: Econ. 52 or 55. Forces which determine the level of income, employment, and output. Particular attention to consumer behavior, investment determination, and government fiscal policy.

213. *Economic Development.* I or II. 3 hr. PR: Econ. 52 or 55. Comprehensive study of problems, changes, and principal policy issues faced by non-industrialized countries in the process of economic development.

216. *History of Economic Thought.* I or II. 3 hr. PR: Econ. 52 or 55. Economic ideas in perspective of historical development.

220. *Introduction to Mathematical Economics.* I or II. 3 hr. PR: Math. 15 or 128, and Econ. 52 or 55; or consent. Principal mathematical techniques including set operation, matrix algebra, differential and integral calculus employed in economic analysis. Particular attention given to static (or equilibrium) analysis, comparative-static analysis and optimization problems in economics.

225. *Applied Business and Economic Statistics.* I, II. 3 hr. PR: Econ. 125 or Stat. 101 or consent. Continuation of Econ. 125. Principal statistical methods used in applied business and economic research including multiple regression, index numbers, time series analysis, forecasting models and methods, and sampling design.

241. *Public Finance.* I, II. 3 hr. PR: Econ. 52 or 55. Governmental fiscal organizations and policy; taxes and tax systems with particular emphasis on the federal government and the state of West Virginia.

245. *Government and Business.* I, II. 3 hr. PR: Econ. 52 or 55. Market structure, conduct, and performance: analysis of the antitrust laws — judicial interpretation and effect on the business sector.

246. *Transportation.* I, II. 3 hr. PR: Econ. 52 or 55. Development of an inland transportation system and relations and policies of transport agencies.

250. *International Economics.* I or II. 3 hr. PR: Econ. 52 or 55. Development of trade among nations; theories of trade, policies, physical factors, trends, and barriers in international economics.

255. *Regional Economics.* I. 3 hr. PR: Econ. 52 or 55. Analysis of the regional economy's spatial dimension, emphasizing interregional capital and labor mobility, the role of cities, objectives and issues of regional policy, lagging regions and Appalachia, growth poles, and regional growth and income distribution.

257. *Urban Economics.* II. 3 hr. PR: Econ. 52 or 55. Analyzes the spatial dimensions of urban economy, emphasizing both urban economic theory and urban policy. Issues include cities and income inequality, urban upgrading function, blight, economics of ghettos, the economies of urban size.

260. *Manpower Economics.* I or II. 3 hr. PR: Econ. 160 or consent. Economics and institutional forces determining the level and composition of labor supply and demand; labor mobility; governmental manpower policies.

262. *Collective Bargaining.* I or II. 3 hr. PR: Econ. 160 or consent. Theory and practice of collective bargaining; contract issues, types of relationships, and role of government policy.

263. *Economics of Wages.* I or II. 3 hr. PR: Econ. 160 or consent. Determination of wage levels and structure; economic and institutional forces determining wage levels and differentials.

265. *Economics of Social Security.* I or II. 3 hr. PR: Econ. 52, 55, or consent. Our social and political efforts to provide economic security, including an examination of parallel developments of private insurance.

270. *Growth of the American Economy.* I, II. 3 hr. PR: Econ. 52 or 55. Central issues in the development of the American economy.

297. *Internship.* I, II, S. 1-12 hr. PR: Econ. 52 or 55 and departmental approval. Field experience in the analysis and solution of economic problems in the public and private sectors.

299. *Readings in Economics.* I, II, S. 1-3 hr. PR: Econ. 52 or 55. Students will develop and carry out a program of specialized readings under the supervision of a cooperating instructor.

Finance (Fin.)

111. *Business Finance.* I, II. 3 hr. PR: Acctg. 51 and 52. Activities of the finance manager in the planning, acquisition, and administration of funds used in a business enterprise.

112. *Financial Management.* II. 3 hr. PR: Fin. 111. Application of fundamentals and theory to the analysis of cases in business finance.

115. *General Insurance.* I, II. 3 hr. Theory of risk and its application to insurance; principles underlying insurance — life, property, casualty, fire, and surety.

120. *Life Insurance.* I. 2 hr. PR: Fin. 115. Principles of life-insurance protection; legal regulation of insurance companies.

150. *Investments.* I. 3 hr. PR: Fin. 111 or consent. Investment analysis and management for the individual and the financial institution.

151. *Financial Institutions.* I. 3 hr. PR: Fin. 111. Study of the role of the financial institutions as they affect the supply and demand for funds. An analysis of the factors affecting supply and demand and the markets which allocate funds to using units.

161. *Real Estate.* II. 3 hr. Principles and practices of real estate business.

200. *Special Topics.* I, II, S. 1-4 hr. PR: Fin. 111 or consent. Special topics relevant to finance. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward bachelor's and master's degrees.

216. *Risk Management.* II. 3 hr. PR: Fin. 115 or consent. Transferable risks with which the entrepreneur must deal. Emphasis on the process by which decisions are made for handling these risks, including an examination of contributions and limitations of insurance system.

250. *Applied Security Analysis.* II. 3 hr. PR: Fin. 150 or consent. The systematic selection, assessment, and ranking of corporate securities in a portfolio framework through a synthesis of technical analysis, accounting principles, quantitative techniques for forecasting, fiscal and monetary policies, and behavioral influences.

251. *Bank Management.* II. 3 hr. PR: Fin. 111. Study of the management of commercial bank funds. Examination of the principles applicable to the various types of lending and investing within legal restraints of government.

261. *Real Estate Appraising.* 3 hr. PR: Fin. 161. The course defines the appraisal problem, plan the approach, acquire, classify, analyze and interpret data into an estimate of value by the use of the cost or replacement approach, income approach and market approach.

262. *Real Estate Finance.* 3 hr. PR: Fin. 111 and 161. Designed to show how financing, the tax system, and supply and demand interact to create values which, when coupled with investment decision, leads to choosing an investment strategy in real estate.

263. *Real Estate Land Development.* 3 hr. PR: Fin. 161. Designed to give an overall view of property development, including market analysis, financial analysis, planning and design of new developments, construction methods, and the merchandising and/or management of the completed project.

299. *Independent Study.* I, II, S. 1-3 hr. PR: Consent. Students will develop and complete a program of specialized studies under the supervision of a cooperating instructor.

Management (Manag.)

105. *Contemporary Management.* I, II. 3 hr. PR: (Course to be taken by business students in their first semester in the College.) A study of management as a process of

planning, organizing, directing and controlling business activities with economic, social, and behavioral influences. Introduction to organizational behavior theory and systems theory concepts.

111. *Operations Management.* I, II, S. 3 hr. PR: Manag. 105 and Econ. 125 or consent. A survey of management operations problems, including the areas of inventory control, scheduling, quality control, facility design, and work analysis.

112. *Quantitative Business Methods.* I, II, S. 3 hr. PR: Com. S. 1 and Econ. 125 or consent. A survey of quantitative tools and techniques with emphasis on applications in accounting, finance, marketing, personnel, and operations functions, both singly and in combination.

160. *Management of Small Business.* I, II. 3 hr. PR: Manag. 105. Focusing on the management of small business, the course is designed both for those seeking employment in small business, and for those entering large organizations which deal with small firms as suppliers, customers, and competitors.

200. *Special Topics.* I, II, S. 1-4 hr. PR: Manag. 105 or consent. Special topics relevant to management. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward bachelor's and master's degrees.

201. *Business Information Systems.* I, II. 4 hr. PR: Manag. 105, Fin. 111, Mrktg. 111, Acctg. 52, Com. S. 1. Use of EDP for decision making and emphasis on application in the functions of finance, marketing, personnel, accounting, and operations management. 3 hr. lect., 3 hr. lab.

205. *The Individual and the Organization.* II. 3 hr. Examination of how the individual, the group, and the organization interact to influence the behavior of the business organization and that of its human resources.

206. *Organizational Theory and Analysis.* II. 3 hr. PR: Manag. 205 or consent. Influences of structure on the behavior and dynamics of the business organization.

210. *Business Decision-Making Under Uncertainty.* I. 3 hr. PR: Manag. 112 or Com. S. 1 and Manag. 111. Analysis of business problems where certainty does not exist. The case approach with actual or realistic date involving more than one business functional area. Solution of unique business problems.

213. *Problems in Business Administration.* I, II, S. 1-3 hr. Selected management problems related to the total enterprise and the emerging technostructure, e.g., managerial and corporate strategy, utilization of resources, social responsibility and government relations, dynamics of new industries.

216. *Personnel Management.* I, II. 3 hr. Leading and motivating people whose work behavior is influenced by technology, organization, and management style as those affect the individual and work groups.

217. *Personnel and Compensation.* I, II. 3 hr. PR: Manag. 216. Designing and implementing total compensation systems in both private and public sectors. The emerging elements of total compensation systems are included providing insights into problems and opportunities for personnel.

218. *Focal Points in Management.* I, II. 1-3 hr. PR: Manag. 105. In-depth study of specialized management subjects, e.g., personnel interviewing, job descriptions, consulting, or organizational development. *(Each subject is self-contained, spans one-third of a semester, and is valued at 1 credit hour.)*

220. *Deterministic Decision Analysis.* II. 3 hr. PR: Manag. 112. Study and application of quantitative methods to business problems in which deterministic conditioning prevail.

225. *Business Policy.* I, II. 3 hr. PR: Senior standing and consent. Integrated study of policies, organization, facilities, and control techniques of business enterprises.

299. *Independent Study.* I, II, S. 1-3 hr. PR: Consent. Students will develop and complete a program of specialized studies under the supervision of a cooperating instructor.

230. *Entrepreneurship.* I, II. 3 hr. PR: Manag. 160. The role of the entrepreneur in business and society, includes an analysis of the individual entrepreneur, and investigates the nature and problems of establishing a new business enterprise.

260. *Practicum in Small Business.* I, II. 3 hr. PR: Manag. 160. A practical training ground in the identification and solution of small business problems. Through interaction with the business community, students are exposed to the opportunities and difficulties of small business entrepreneurship.

Marketing (Mrktg.)

111. *Marketing.* I, II. 3 hr. PR: Econ. 54, 55. Analysis of those activities through which business firms direct the flow of their goods and services to consumers and users.

113. *Marketing Research.* I, II. 3 hr. PR: Mrktg. 111, Econ. 125. Utilization of marketing research techniques in solution of practical marketing problems.

115. *Distribution Channels.* I, II. 3 hr. PR: Mrktg. 111. Management of channel systems with emphasis on retail distribution, channel choice, strategies, control, and optimization within the context of role, power, conflict, and communications.

120. *Promotion Management.* I, II. 3 hr. PR: Mrktg. 111 or consent. An analysis of the promotional mix options; advertising; personal selling; and sales promotion, and the integration of these options into the marketing mix.

130. *Product and Price Policies.* I, II. 3 hr. PR: Mrktg. 111. Deals with the company's product offering as well as economic and marketing variables influencing product's price; stress on determination of product and price objectives, planning, implementation, and evaluation of results.

200. *Special Topics.* I, II, S. 1-4 hr. PR: Mrktg. 111 or consent. Special topics relevant to marketing. Maximum of 9 semester hours in any or all courses numbered 200 offered by the College may be applied toward bachelor's and master's degrees.

201. *Focal Points in Marketing.* I. 1-3 hr. PR: Mrktg. 111. In-depth study of specialized marketing subjects, e.g., franchising, tourism, packaging, or product development. Each subject is self-contained, spans one-third of a semester, and is valued at 1 credit hour.

203. *Sales Management.* II. 3 hr. PR: Mrktg. 111. Concentrates on the managerial responsibilities of sales managers for directing, motivating, and controlling a sales force plus the techniques of selling including handling objections and closing.

205. *Consumer Behavior.* II. 3 hr. PR: Mrktg. 111. The nature of the consumer decision process in a marketing framework. Emphasis on the psychological and sociological concepts which influence the decision process.

207. *Business Logistics Management.* I, II. 3 hr. PR: Mrktg. 111. Introduction to the field through examination of transportation, warehousing, materials handling, containerization, inventory control, purchasing, and warehouse location. Significant use made of problem solving with analytical tools.

210. *Intermediate Markets.* I. 3 hr. PR: Mrktg. 111; Corequisite: Mrktg. 211 or consent. A study of marketing to three classes of customers: the industrial market, the institutional market, and government agencies.

211. *Marketing Management.* I, II. 3 hr. PR: Mrktg. 111; senior standing. Simulation through live and written case study should sharpen skills as the student makes analytical evaluations of marketing problems.

299. *Independent Study.* I, II, S. 1-3 hr. PR: Consent. Students will develop and complete a program of specialized studies under the supervision of a cooperating instructor.

Creative Arts Center

Creative development in art, music, and theatre is the purpose of the Creative Arts Center at West Virginia University. A distinguished faculty of musicians, actors, directors, and artists brings to the center's outstanding facilities a commitment to a creative process of artistic growth which is shared with each student. Here, in a rich environment of weekly plays, art exhibits, and concerts, the student is offered the knowledge, skills and inspiration necessary for professional success.

The Division of Art offers a faculty of practicing artists and scholars prepared to train dedicated students for careers as professional artists or teachers of art. While practicing your art in the Creative Arts Center studios you may work toward a degree concentrating in any of the following specialities: Art Education, Ceramics, Graphic Design, Painting, Printmaking, and Sulpture.

The Division of Music offers the opportunity to perform, study, and compose music of all styles under the guidance of an expert faculty of artist performers, teachers, and scholars. Performing groups include the Marching Band, Concert Band, Wind Ensemble, University Choirs, Opera Theatre, Symphony Orchestra, Percussion Ensemble, Jazz Ensembles, Collegium Musicum, and many others.

Degrees are offered with concentration in: Music Education, Performance, Music History, Composition, and Music Theory.

Advanced standing in the Division of Music in Applied Music and Music Theory is given only after examination.

The Division of Theatre offers concentrated training programs in four different areas of the theatre arts and crafts. An outstanding faculty works closely with the undergraduate major both in the classroom and in three campus theatres, as well as on tour with the WVU Puppet Mobile.

Degrees are offered with concentration in any one of the following areas: Acting-Directing-Oral Interpretation, Design-Technical Theatre, Acting-Voice, and General Theatre.

Auditions for scholarships in music and theatre are scheduled throughout the school year. For information or appointment, write the Chairman, Division of Music or Theatre, Creative Arts Center, West Virginia University, Morgantown, WV 26506, or telephone (304) 293-4841.

Students transferring to the Creative Arts Center from other colleges and universities are required to present a minimum grade-point average of 2.0. Exceptions may be made in the case of first-semester freshman students.

Complete information concerning West Virginia University admissions, registration, tuition and fees, and regulations is in Part 2 of the *Undergraduate Catalog.*

Application for Graduation and Diploma

All candidates for degrees in the Creative Arts Center must fill out an application for graduation and diploma at the Undergraduate Records Office. Candidates should make such application during the second semester of their junior year in order to have their records evaluated as to Creative Arts Center and University requirements. Application must be made during the first month of the semester or summer session in which the candidate expects to be graduated. If a student does not, for some reason, graduate on the date for which the

student applied initially, the student must re-apply for a later date. No candidate can be graduated without application.

Faculty

Gilbert Trythall, D.M.A. (Cornell U.), *Dean of Creative Arts Center; Professor of Music.*
John Ellis, M.A. (U. Conn.), *Assistant to the Dean.*
Richard E. Duncan, Ph.D. (U. Rochester), *Dean and Professor Emeritus.*

Division of Art

Urban Couch, M.F.A. (Cranbrook Acad. Art), *Chairman and Professor of Art.*
Robert P. Anderson, Jr., M.F.A. (Alfred U.), *Associate Professor of Art.*
Peter E. Charles, M.F.A. (Yale U.), *Associate Professor of Art.*
John D. Clarkson, M.A. (U. Pitt.), *Professor of Art; Curator and Director of Acquisitions.*
Barbara A. Drainer, Ed.D. (Columbia U.), *Professor Emerita.*
Michael E. Dupree, M.A. (Appal. St. U.), *Instructor in Art.*
David L. Faber, M.F.A. (So. Ill. U.), *Assistant Professor of Art.*
Ben F. Freedman, M.A. (U. Ariz.), *Professor of Art.*
L. Victor Haines, *Instructor (part-time) in Art.*
Clifford A. Harvey, B.F.A. (Mpls. C. Art & Des.), *Associate Professor of Art.*
Stephen Lawson, M.F.A. (U. Colo.), *Assistant Professor of Art.*
Wendell E. McPherson, *Instructor (part-time) in Art.*
Thomas V. Nakashima, M.F.A. (U. N. Dame), *Associate Professor of Art.*
Charles E. Patton, A.M. (Case West Res. U.), *Professor Emeritus.*
Margaret T. Rajam, Ph.D. (U. Mich.), *Associate Professor of Art.*
Helen Reese, M.A. (Ohio U.), *Instructor (part-time) in Art.*
John B. Schultz, M.A. (U. Pitt.), *Instructor in Art.*
William J. Thomas, M.A. (Phila. C. Art), *Associate Professor of Art.*

Division of Music

Cecil B. Wilson, Ph.D. (Case West. Res. U.), *Chairman and Professor of Music.*
Raeder Anderson, M.M. (U. Wash.), *Associate Professor of Music. Voice.*
Sylvia Arnett, Dipl. (Juilliard Sch. Mus.), *Instructor (part-time) in Music. Violin.*
Dawn S. Baker, Ph.D. (U. Md.), *Assistant Professor of Music. Music Education.*
John Beall, Ph.D. (U. Rochester), *Associate Professor of Music. Composition, Theory.*
James W. Benner, M.A. (Columbia U.), *Associate Professor of Music. Vocal Diction, Repertoire; Opera Theatre; Piano.*
Clifford W. Brown, M.F.A. (Carnegie-Mellon U.), *Professor Emeritus.*
Thomas S. Brown, Ph.D. (Northwestern U.), *Associate Professor of Music. Music Education.*
Thomas S. Canning, M.M. (U. Rochester), *Professor Emeritus.*
Joyce A. Catalfano, M.M. (Ithaca C.), *Assistant Professor of Music. Flute.*
Jon Crain, *Professor of Music. Voice.*
Rose M. Crain, *Associate Professor of Music. Voice.*
Harry Elzinga, Ph.D. (Ind. U.), *Associate Professor of Music. Musicology. Collegium Musicum.*
Clyde N. English, D.S.M. (Union Theol. Sem.), *Professor of Music. Organ.*
Philip J. Faini, M.M. (WVU), *Professor of Music. Percussion, African Music. Coordinator, Brass-Percussion.*
Herman Godes, M.M. (Latvian St. Mus. Acad.), *Professor of Music. Piano. Coordinator, Keyboard.*
Reginald W. Goeke, M.S. (U. Ill.), *Assistant Professor of Music. Music Education. Coordinator, Music Education.*
John Goldsmith, M.S. (Westminster Choir C.), *Assistant Professor of Music; Director of Choral Activities.*
Joseph A. Golz, M.A. (Columbia U.), *Professor Emeritus.*

Stephen M. Heyde, M.M. (Carnegie-Mellon U.), *Assistant Professor of Music. Violin; Assistant Director, Orchestras.*
Leo Horacek, Ph.D. (U. Kans.), *Professor of Music. Music Education.*
Barton Hudson, Ph.D. (Ind. U.), *Professor of Music. Musicology, Harpsichord. Coordinator, Music History-Literature.*
Jonathan R. Lautman, B.M. (N.C. Sch. Arts), *Instructor in Music. Clarinet.*
Gerald Lefkoff, Ph.D. (Cath. U. Am.), *Professor of Music. Theory, Electronic Music, Composition, Viola.*
Frank E. Lorince, Jr., Ph.D. (U. Rochester), *Professor of Music. Theory. Coordinator, Theory-Composition.*
Margaret S. Lorince, M.M. (U. Rochester), *Associate Professor of Music. Chairwoman, Preparatory Department. Piano.*
Jeffrey T. Mangone, B.S.M.E. (Duquesne U.), *Instructor (part-time) in Music. String Bass.*
Jack McKie, M.Ed. (U. Nebr.), *Instructor (part-time) in Music. Trumpet.*
David P. McCollum, M.M. (Duquesne U.), *Instructor (part-time) in Music. Tuba.*
Bernard R. McGregor, M.F.A. (Carnegie-Mellon U.), *Associate Professor Emeritus of Music.*
James E. Miltenberger, D.M.A. (U. Rochester), *Professor of Music. Piano, Piano Repertoire.*
Randall G. Misamore, M.M. (No. Ill. U.), *Instructor in Music. Assistant Director of Bands. Jazz Ensemble, Saxophone.*
Jane R. Pestun, M.M. (WVU), *Assistant Professor of Music. Piano.*
Donald C. Portnoy, D.M.A. (Peabody Cons. Mus.), *Professor of Music. Violin; Conducting; Director of Orchestral Activities. Coordinator, Strings.*
Richard E. Powell, M.Ed. (S.W. Tex. St. C.), *Associate Professor of Music. Low Brass Instruments.*
Cheryl A. Priebe, M.M. (Va. Commonwealth U.), *Instructor in Music. Oboe, Theory.*
George E. Schafer, Ph.D. (U. Rochester), *Professor of Music. Musicology, Director, Graduate Studies.*
Carl D. Shank, Jr., M.M. (N. Tex. U.), *Instructor in Music. Piano.*
Roger C. Sherman, M.M. (U. Rochester), *Professor of Music. Trumpet; Assistant Chairman.*
William Skidmore, M.M. (U. Ill.), *Associate Professor of Music. Cello, Chamber Music.*
Edward A. Sprague, M.S. (Syracuse U.), *Associate Professor of Music — University Extension.*
David J. Sternbach, M.M. (Ind. U.), *Instructor in Music. French Horn, Chamber Music.*
June D. Swartwout, M.M. (WVU), *Assistant Professor of Music. Voice; Coordinator, Voice — Opera.*
Don G. Wilcox, M.A. (Cal. St. C., L. Bch.), *Associate Professor of Music. Theory, Conducting; Director of Bands.*
Christopher Wilkinson, Ph.D. (Rutgers U.), *Assistant Professor of Music. Musicology, Music Appreciation, Theory.*
William O. Winstead, M.M. (WVU), *Associate Professor of Music. Bassoon, Theory, Composition; Coordinator, Woodwinds.*
Frances Yeend, *Professor Emerita.*

Division of Theatre

John C. Whitty, Ph.D. (U. Iowa), *Chairman and Professor of Theatre.*
Stanley E. Abbott, M.A. (Mich. St. U.), *Associate Professor of Theatre.*
Sam Boyd, Jr., M.F.A. (Carnegie-Mellon U.), *Professor Emeritus of Theatre.*
Mary Kathryn Gonder Brindle, M.A. (WVU), *Assistant Professor of Theatre.*
Robert B. Burrows, Ph.D. (Ohio St. U.), *Professor Emeritus of Theatre.*
Louis J. Chorba, B.S. (Miami U, O.), *Instructor in Theatre.*
Gary S. Daines, M.F.A. (U. Utah), *Instructor in Theatre.*
John W. Ellis, M.A. (U. Conn.), *Lecturer (part-time) in Theatre.*
Joe E. Ford, M.A. (WVU), *Professor of Theatre.*
Frank Gagliano, M.F.A. (Columbia U.), *Claude Worthington Benedum Professor of Theatre.*

Phyllis A. Lehmann, M.A. (U. Conn.), *Instructor in Theatre.*
Patrick B. Murphy, M.A. (U. Wash.), *Associate Professor of Theatre.*
Charles D. Neel, Ph.D. (Cornell U.), *Professor of Theatre.*
Joann Spencer Siegrist, M.F.A. (U. Ga.), *Instructor in Theatre.*
Albert D. Tucci, M.F.A. (Goodman Sch. of Drama, Art Inst. of Chi.), *Associate Professor of Theatre.*
Jon S. Whitmore, Ph.D. (U. Cal.), *Associate Professor of Theatre.*

Division of Art

Each student entering the Division of Art is encouraged to become a member of a community of creative artists formed by the art faculty and student body. The structure of the curricula is such that the art student is offered an opportunity to explore many of the important fields of visual arts. Close relationships between art students and the faculty are maintained so that students are afforded the opportunity of sharing in the creative insights and personal works of a staff of professional artists and scholars.

Undergraduate programs in art offer a full range of scholarly and studio experience to potential artists and teachers.

The Bachelor of Fine Arts or Bachelor of Arts degree is confered upon any student who satisfies all departmental and entrance requirements, completes the appropriate curriculum, and complies with the general regulations of the University concerning degrees.

A candidate for a degree in the Division of Art must establish a minimum average of 2.0 (C) grade points per semester hour. In addition, students may be asked to present a portfolio of selected works for examination and evaluation by a faculty committee. The committee is empowered to make recommendations regarding the student's continuing work toward a degree in art. All students enrolled in art courses, other than Art History, are required to purchase some personal equipment and expendable supplies.

Transfer students must establish transfer credit from other institutions during the first semester in which they are enrolled in the Division of Art.

Bachelor of Fine Arts Curriculum

Students in this curriculum are given preparation in the following basic disciplines: drawing, design, art history, painting, sculpture, ceramics, graphic design, and printmaking. Students completing this program are prepared to work as professional artists in the visual arts. In addition, graduates with this background may prepare for careers in a wide range of cultural, commercial, and industrial activities.

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Art 11	3	Art 12	3	Art 113 or 114	3	Art 211	3
Art 105	3	Art 106	3	Art 123 or 124	3	Art 130 or 131	3
Art 121	3	Art 122	3	Art 126 or 127	3	Art 124 or 141	3
Engl. 1	3	Engl. 2	3	Core B	3	Core B	3
P.E. 1	1	P.E. 2	1	Core C	4	Core B	3
Core C	4	Core C	4				
	17		17		16		15

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Art 100 level	3	Art 200	6	Art 200	6	Art 200	6
Art elective	3	Art elective	6	Art 212	3	Art 200	6
Art Hist. 200	3	Art Hist. 200	3	Elective	6	Elective	3
Elective	3	Core B	3				
Core A	3						
	15		18		15		15

Total: 128 hr.

One semester is required of all students in each major studio area: painting, sculpture, ceramics, printmaking, graphic design. A second semester of a 100-level course is required before a student is admitted to a 200-level course in that area.

A minimum of 24 hours of Art 200 level courses in the third and fourth year must represent a single area of concentration: painting, sculpture, printmaking, ceramics and graphic design.

Bachelor of Art — Art Education Curriculum

To qualify for teaching Art in the public schools, elementary through the secondary level, the student should complete the Art Education single comprehensive curriculum, Grades K-12. Students who wish to qualify for teaching art should contact the Art Education adviser, Room 2255, Creative Arts Center.

ART EDUCATION CURRICULUM — GRADES K-12

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Art 11	3	Art 12	3	Art 113	3	Art 114	3
Art 105	3	Art 106	3	Art 126	3	Art 127	3
Art 121	3	Art 122	3	Art 130 or 131	3	Art 140 or 141	3
Engl. 1	3	Engl. 2	3	Literature	3	Music 30	3
P.E. 1	1	P.E. 2	1	C&I	2	Art Elective	3
Core C	4	Core C	4	Core B	3	Core B	3
	17		17		17		18

THIRD YEAR				FOURTH YEAR*			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Art 123 or 124	3	Art 166	3	C&I 187	6	Art 211	3
Art 165	3	Ed. P. 106	3	C&I 188	6	Art Elective	3
Ed. P. 105	3	Math	3	C&I 104	3	Hl. Ed. 101	
Core A	3	Core A	3			or 102	2
Core B	3	Core B	3			Rdng. 222	2
						Elective	3
						Elective	3
	15		15		15		16

Total: 130 hours

*The sequence of the two senior semesters (Fourth Year) may be reversed.

Combined Bachelor of Fine Arts — Certification

This option which involves additional course work can be provided for students in the Bachelor of Fine Arts curriculum who wish to qualify for teaching art in the public schools. Interested students must obtain written consent from the Chairman of the Division of Art and the Art Education Coordinator after the completion of two semesters.

Courses of Instruction in Art

3. *Materials and Procedures.* I, II, S. 3 hr. For elementary education majors. Designed to familiarize the student with two- and three-dimensional media, processes and concepts.

11. *Drawing.* I, II. 3 hr. Fundamental principles of drawing.

12. *Drawing.* I, II. 3 hr. Fundamental principles of drawing. *(Complementary to Art 11.)*

30. *Appreciation of Visual Arts.* I, II, S. 3 hr. The study of outstanding works of the visual arts from times past to the present: (1) sources of the creative impulse, and (2) relationship of art to the civilization producing it.

100. *Directed Art Studies.* I, II, S. 1-3 hr. *(May be repeated for credit.)* PR: Consent. Studies in painting, sculpture, printmaking, graphic design, ceramics, drawing, art education, art history; includes independent study.

105. *Survey of Art.* I. 3 hr. History of visual art from prehistoric times to the Renaissance.

106. *Survey of Art.* II. 3 hr. History of visual art from Renaissance to the present.

113. *Painting.* I, II. 3 hr. PR: Art 12, 121 or equiv. Basic concepts and techniques in watercolor and/or acrylic painting.

114. *Painting.* I, II. 3 hr. PR: Art 12, 121 or equiv. Basic concepts and techniques in oil painting.

121. *Visual Foundation.* I, II. 3 hr. Visual perception, composition, manipulation of materials, and exploration of two-dimensional formal elements.

122. *Visual Foundation.* I, II. 3 hr. Three-dimensional formal elements (Continuation of Art 121.)

123. *Graphic Design.* I, II. 3 hr. PR: Art 12, 121 or equiv. An introduction to the tools, materials, and basic principles of graphic design with emphasis on form and color.

124. *Graphic Design.* I, II. 3 hr. PR: Art 123 or equiv. An introduction. Complementary to Art 123, with particular emphasis on typographic solutions.

126. *Sculpture.* I, II. 3 hr. PR: Art 12, 122 or equiv. An introduction to basic sculptural concepts using simple materials and techniques.

127. *Sculpture.* I, II. 3 hr. PR: Art 126 or equiv. Extension of Art 126, using more complex materials and techniques.

130. *Printmaking.* I, II. 3 hr. PR: Art 12, 121 or equiv. Basic concepts and techniques of intaglio printmaking.

131. *Printmaking.* I, II. 3 hr. PR: Art 12, 121 or equiv. Basic concepts and techniques of lithographic printmaking.

140. *Ceramics.* I, II. 3 hr. PR: Art 12, 122 or equiv. Basic concepts, techniques and media in ceramics.

141. *Ceramics.* I, II. 3 hr. PR: Art 12, 122 or equiv. Fundamental concepts, techniques, and media; complementary to Art 140.

165. *Art Education in the Elementary School.* I. 3 hr. PR: Art 12, 122 or equiv. The content and character of art education at the elementary level, emphasizing methods and techniques of instruction.

166. *Art Education in the Secondary School.* II. 3 hr. PR: Art 12, 122 or equiv. The content and character of art education at the secondary level, emphasizing methods and techniques of instruction.

200. *Directed Art Studies.* I, II, S. 1-15 hr. (May be repeated for credit.) PR: Consent. Studies in painting, sculpture, printmaking, graphic design, ceramics, drawing, art education, art history; includes independent study.

211. *Figure Drawing.* I, II, S. 3 hr. PR: Art 12, 121 or equiv. A course in compositional structure from the figure.

212. *Advanced Drawing.* I, II, S. 3 hr. (May be repeated for credit.) PR: Art 211 or equiv. Advanced tutorial drawing course.

Division of Music

The student interested in a career in music has a wide range of occupations from which to choose. Most fall into one of three basic categories: performing, composing or arranging, and teaching. To these ends, the Division of Music offers specialized programs in Performance (Applied Music), Theory-Composition, Theory-Music History, and Music Education, all of which lead to the degree of Bachelor of Music. Each of these curricula prepares the student for the added career option of private studio teaching in the principal performance area.

Students who complete a curriculum in Music Education will have satisfied course requirements to teach both vocal and instrumental music, as well as general music, in the elementary and secondary schools, grades K-12. With further study on the graduate level, students may qualify for teaching positions in a junior or community college, four-year college, or university. Others may aspire to a career in performance as a solo artist or as a member of an ensemble, or may compose or arrange music for performance.

Music graduates sometimes pursue interests in such areas as music librarianship, arts management, arts journalism/criticism, or in the music publishing and manufacturing industries, in consulting, editorial, sales, or management positions.

A music major can change from one music curriculum to another, particularly during the freshman or sophomore year, without great loss of course credit. Music majors are encouraged to explore and follow the curriculum for which they are best qualified and in which they can expect the greatest success. Evaluation of their work by the Division of Music faculty will aid these decisions.

Some students who wish a broader, liberal arts-oriented program may pursue the Bachelor of Arts (B.A.) degree. The B.A., with a major in Musical Arts — offered jointly with the College of Arts and Sciences — is described in the following material.

The Division of Music holds full membership in the National Association of Schools of Music. The Music Education program offered in the Division is fully accredited by the National Council for Accrediation of Teacher Education. In addition to the undergraduate program, courses leading to the following graduate degrees are offered: Master of Music, Doctor of Philosophy, Doctor of Musical Arts, and Doctor of Education in cooperation with the College of Human Resources and Education.

The 41-member faculty brings a rich background in professional performance and musical scholarship, along with a sincere interest in students, to its teaching. Students find these dedicated teachers to be both demanding and sympathetic.

Faculty performing groups in the Division include the Abbey Brass Guild, various Woodwind Ensembles, Baroque Ensemble, American Arts Trio, and the Amart String Quartet. The West Virginia Symphonette, a professional chamber orchestra, includes many faculty among its membership. Student performing groups, in addition to those listed below, include the Opera Theatre,

Percussion Ensemble, Trombone Ensemble, and numerous small chamber ensembles.

Musical Organizations

After completing four semesters in one of the bands or the orchestra, especially qualified members of these organizations may continue service in them upon invitation and receive allowances in the form of remission of fees amounting to $30.00 per semester.

The *University Orchestras* are open, by audition, to all students and residents of the community who are proficient in the playing of an orchestra instrument. The repertoire is that of the standard orchestra, with special emphasis on contemporary American music. (May be taken for 1 hour credit.)

The *University Choir* is an ensemble of forty vocalists selected by audition. The group sings the standard choral repertoire and makes off-campus appearances during the year. (May be taken for 1 hour credit.)

The *Collegium Musicum* is devoted to the performance of music for small vocal or instrumental ensembles, primarily early music. (May be taken for 1 or 2 hours credit.)

The *University Choral Union* is open to all University students who can satisfactorily sing a part, by audition. This organization offers opportunity to participate in the performance of major choral works. (May be taken for 1 hour credit.)

The *Wind Ensemble* is a select group of approximately forty wind and percussion players chosen by audition and performs music particularly appropriate to its size and special characteristics. (May be taken for 1 hour credit.)

The *Concert Band* is open to all qualified WVU students by audition. It performs both traditional and contemporary band music. (May be taken for 1 hour credit.)

The *Mountaineer Marching Band* of three-hundred students is open to all qualified students in the University. Its activities are confined to the first semester, during which time it presents music and marching pageantry at football games and other special occasions. (May be taken for 1 hour credit.)

The *Jazz Ensembles* are stage bands which perform many original compositions as well as those from the big band era and from the repertory of contemporary jazz bands. Membership is by audition. (May be taken for 1 hour credit.)

Bachelor of Music Degree

Acceptance. Before being accepted as a music major, each student must demonstrate satisfactory previous musical preparation through an entrance audition. These conference-auditions are held in Morgantown throughout the school year, and in Charleston and other cities by special arrangement. A tape recording and other supporting material may be submitted when circumstances prevent a visit to Morgantown for this purpose. Dates of these auditions and details concerning them are available from the Division of Music.

In addition to fulfilling the special requirements indicated below for the appropriate curriculum, each student also must satisfy the following general requirements.

Proficiency Levels. Before graduation, each undergraduate student must satisfy a specified Proficiency Level appropriate to the curriculum in the student's principal performance area, in piano (if piano is not the major instrument), and in voice (in the case of instrumental music education majors). A list-

ing of the Proficiency Levels for each area is available from the Division of Music. The listed repertoire (or works of comparable technical and musical difficulty) for each level is to be performed with musical understanding as well as technical mastery in order to satisfy the requirement. Students who are admitted conditionally must make up deficiencies as soon as possible. Lack of reasonable progress will subject the student to probation. If, in the judgment of the faculty, it will be impossible for the student to complete graduation requirements in a reasonable length of time, the student's enrollment in the Division of Music will be terminated.

Keyboard Proficiency Examination. In addition to fulfilling the Proficiency Level requirement in piano indicated in the curriculum, each student is required to demonstrate proficiency in keyboard harmony by passing a special examination.

Recital and Concert Attendance. Each full-time undergraduate music major must maintain a satisfactory record of attendance at recitals and concerts presented at WVU during each semester of residence.

Participation in Musical Organizations. Each music major must participate in musical organizations as indicated in the curriculum. Scholarship recipients may be called upon to render special service (as participants in particular organizations or ensembles, as piano accompanists, etc.), as designated by the division chairman.

Completion of Degree Requirements. The student is responsible for correctly fulfilling all graduation requirements. Each student should review the curriculum requirements both before and after every registration period so that errors or omissions will be detected immediately. *Transfer students* must establish transfer credit from other institutions as early as possible in their WVU study — hopefully during the first semester of residence. The degree of Bachelor of Music is conferred upon any student who complies with the general regulations of the University concerning degrees, satisfies departmental requirements, including expected Proficiency Levels, and completes an appropriate curriculum with a minimum overall grade-point average of 2.0 (C).

The sample curricular outlines which follow may vary as to actual distribution in individual semesters. The precise number of elective credits in a given semester, for example, may vary with the student's choice of courses. In curricula in which the course number Music 110 is listed twice, the student is expected to study both principal and secondary instruments.

Applied Music

The Applied Music curricula are especially designed for students wishing to prepare themselves as performers or as teachers of a particular instrument or voice. The increased interest of society today in the arts is creating many new opportunities for the professional musician and for the private music teacher.

A student in an Applied Music curriculum should enter as a freshman having achieved Grade Level 6 in the principal performance area, and must complete Grade Level 10 in that area to be eligible for graduation. In addition to presentation of a senior recital, Applied Music majors also must make three solo appearances on the major instrument in upper-level student recitals.

Applied Music majors are encouraged to participate in the division's major performing organizations (Music 100-105). A maximum of 8 hours of credit in these organizations will be counted toward requirements for graduation.

APPLIED CURRICULUM — PIANO

At least 2 of the 8 hours to be earned through participation in musical organizations (Music 100-105) must be as a member of a choral group (Music 102 or 105). With the permission of the Coordinator of Keyboard Studies, up to 4 hours of this requirement may be satisfied by enrollment in Music 115, Section 9 (Chamber Music-Accompanying). A total of 16 hours of courses from Core groups B and C is required, with no less than 6 hours to be earned in either group. Theory electives may include Music 263, 264, 171, 172, 160, 260, 265, 267, 268. A recommended distribution of the courses required in this curriculum:

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*Second Sem.*			*Hr.*
Music 110	4	Music 110	4	Music 110	4	Music 110	4
Music 61, 62	4	Music 63, 64	4	Music 65, 66	4	Music 67, 68	4
Music 100-105	1	Music 31	1	Music 33	2	Music 34	3
Engl. 1	3	Music 100-105	1	Music 100-105	1	Music 100-105	1
P.E. 1	1	Engl. 2	3	Music 115	1	Music 115	1
Core B or C	3	P.E. 2	1	Music elective	2	Music elective	2
		Core B or C	3	Elective	3	Elective	3
	16		17		17		18

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4	Music 110	4	Music 110	4
Music 100-105	1	Music 231, 232,		Music 115	1	Music 115	1
Music 115	1	235-237	3	Music 218	2	Music 219	2
Music 118	1	Music 100-105	1	Non-music		Music 299	2
Theory elect.	2	Music 115	1	elective	3	Music 100-105	1
Theory elect.	3	Music 119	2	Music 100-105	1	Music elective	2
Music elective	2	Theory elect.	2	Music elective	2	Core B or C	4
Core A	3	Music elective	2	Core B or C	3		
		Core B or C	3				
	18		18		16		16

Total: 136 hr.

Applied Curriculum — Piano Pedagogy Emphasis

Admission only by approval of the piano faculty. Required for graduation: Proficiency Level 9; Senior recital; and 3 performances on upper level recitals.

Candidates for the Applied Degree in Piano with Pedagogy Emphasis will follow the basic Applied Piano curriculum with the following changes:

1. In Second Year — Substitute 4 hours of Music 118-119 for the 4 hours of music elective.

2. In Third Year — Substitute 3 hours of Music 210 or 212 for the 2 hours of Music 118 and 2 hours of music elective during the first semester, and 3 hours of Music 151 for the 2 hours of Music 119 and 2 hours of music elective during the second semester. Requires 17 hours each semester.

3. In Fourth Year — Substitute 3 hours of Music 210 or 212 for 2 hours of elective during the first semester and 2 hours of Major Project — Music 200 — for the 2 hours of music elective during the second semester. Requires 17 hours the first semester and 16 hours the second semester.

Applied Curriculum — Piano Jazz Emphasis

Admission only by approval of the piano faculty. (Limited to those students with experience and a demonstrated ability in the area of jazz improvisation.) Required for graduation: Proficiency Level 9; Senior recital (no more than one-half of program consisting of jazz); and 3 student recital performances.

Candidates for the Applied Degree in Piano with Jazz Emphasis will follow the basic Applied Piano curriculum with the following change: Only 2 hours of Music 100-105 required with the remaining 6 hours of participation in musical organizations to be earned in non-piano sections of Music 115 which require a jazz pianist (Jazz Ensemble, Trombone Ensemble, Percussion Ensemble, etc.).

Applied Curriculum — Piano Coaching-Accompanying Emphasis

Admission only by approval of the piano faculty. Required for graduation: Proficiency Level 10; Senior Recital; coach and accompany under supervision: 2 full voice recitals, 1 string recital, 1 recital of another instrument (Clarinet, Flute, Oboe, Horn); coach, prepare musically and accompany in performance 2 scenes from standard repertory operas in their original languages (scenes should involve a minimum of 2 people and be scenes with some dramatic development). No solo performances on Upper Level Recitals are required.

Candidates for the Applied Degree in Piano with Coaching-Accompanying emphasis will follow the basic Applied Piano curriculum with the following changes:

1. In Second Year — Substitute Music 218-219 — Voice Repertoire, 4 hours, Music 113, 4 hours, and Music 19, 2 hours (1 hour each semester), for 10 hours elective.

2. In Third Year — Substitute Music 113, 4 hours for the music elective; and add Music 19, 2 hours (1 hour each semester). Requires 19 hours each semester.

3. In Fourth Year — Add Music 19, 2 hours (1 hour each semester). Requires 17 hours each semester.

APPLIED CURRICULUM — ORGAN

In addition to the required Proficiency Level 10 in organ, this curriculum also requires achievement of Proficiency Level 5 in piano before graduation. At least 6 of the 8 credit hours to be earned through participation in musical organizations (Music 100-105) must be as a member of a choral group (Music 102 or 105). A total of 16 credit hours from Core groups B and C is required, with no less than 6 credit hours earned in either group. A recommended distribution of the courses required in this curriculum:

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4	Music 110	4	Music 110	4
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Music 61, 62	4	Music 63, 64	4	Music 65, 66	4	Music 67, 68	4
Music 100-105	1	Music 31	1	Music 33	2	Music 34	3
Music 100-105	1	Engl. 2	3	Music 100-105	1	Music 100-105	1
Engl. 1	3	P.E. 2	1	Elective	3	Elective	3
P.E. 1	1	Core B or C	3-4				
Core B or C	3						
	18		19		16		17

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4	Music 110	4	Music 110	4
Music 51	1	Music 51	1	Music 100-105	1	Music 100-105	1
Music 265	3	Music 231, 232,		Music 218	1	Music 219	1
Music 263	2	235-237	3	Non-Music elect.	3	Music 299	2
Music 118	1	Music 264	2	Music elective	4	Music elective	4
Music 100-105	1	Music 119	1	Core B or C	3	Core B or C	3-4
Music elective	2	Music 100-105	1				
Core A	3	Music elective	2				
		Core B or C					
	17		17		16		16

Total: 136 hr.

APPLIED CURRICULUM — BAND OR ORCHESTRA INSTRUMENT
Flute, Oboe, Clarinet, Saxophone, Bassoon, Horn, Trumpet, Trombone, Euphonium, Tuba, Percussion, Violin, Viola, 'Cello, and Double Bass

In addition to the required Proficiency Level 10 on the major instrument, this curriculum also requires achievement of Proficiency Level 3 in piano before graduation. A total of 16 credit hours of courses from Core groups B and C is required, with no less than 6 credit hours earned in either group. A recommended distribution of the courses required in this curriculum:

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4	Music 110	4	Music 110	4
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Music 61, 62	4	Music 63, 64	4	Music 65, 66	4	Music 67, 68	4
Music 31	1	Music 100 or 103	1	Music 33	2	Music 34	3
Music 100 or 103	1	Engl. 2	3	Music 100 or 103	1	Music 100 or 103	1
Engl. 1	3	P.E. 2	1	Elective	3	Elective	3
P.E. 1	1	Core B or C	3				
Core B or C	3						
	18		19		16		17

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4	Music 110	4	Music 110	4
Music 171	2	Music 172	2	Music 231, 232,		Music 299	2
Music 118	1	Music 119	1	235-237	3	Music 115	1
Music 115	1	Music 115	1	Music 115	1	Music 100 or 103	1
Music 100 or 103	1	Music 100 or 103	1	Music 100 or 103	1	Music elective	2
Music 263	2	Music 264	2	Music elective	2	Core B or C	3-4
Music 265	3	Core B or C	3-4	Non-music elect.	3		
Core A	3			Core B or C	3-4		
	17		14		17		14

Total: 132 hr.

APPLIED CURRICULUM — VOICE

In addition to the required Proficiency Level 10 in voice, a student completing this curriculum must also achieve Proficiency Level 3 in piano before graduation. One year of either Italian, French, or German is required, as is one course from each Core group (A, B, and C). A recommended distribution of the courses required in this curriculum:

FIRST YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 110	2	Music 110	2
Music 61, 62	4	Music 31	1
Music 113	2	Music 63, 64	4
Music 102 or 105	1	Music 113	2
Engl. 1	3	Music 102 or 105	1
P.E. 1	1	Engl. 2	3
		P.E. 2	1
	17		18

SECOND YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 110	2	Music 110	2
Music 65, 66	4	Music 67, 68	4
Music 33	2	Music 34	3
Music 113	2	Music 113	2
Music 102 or 105	1	Music 102 or 105	1
	15		16

THIRD YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 19	2	Music 19	2
Music 263	2	Music 264	2
Music 265	3	Music 102 or 105	1
Music 102 or 105	1	For. Lang.	3
For. Lang.	3	Core B or C	3
Core B or C	3		
	18		15

FOURTH YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	4	Music 110	4
Music 118	1	Music 119	1
Music 19	2	Music 19	2
Music 218	2	Music 219	2
Music 231, 232, 235-237	3	Music 299	2
Music 102 or 105	1	Music 102 or 105	1
Music elective	3	Music elective	2
		Core A	3
	16		17

Total: 132 hr.

APPLIED CURRICULUM — WOODWINDS

Applied music majors whose major instrument is in the woodwind family and who show strong performance ability on another woodwind instrument may qualify for the Applied Curriculum in Woodwinds. Approval for admission to this curriculum will not be given by the woodwind faculty until after the first year of study. In addition to the senior recital (which may be given on more than one instrument), the student in this curriculum must present three solo upper-level student recital performances, one on each of the three major instruments. Proficiency Level requirements for this curriculum are:

A primary major woodwind instrument: Proficiency Level 9.

Two secondary major woodwind instruments: Proficiency Level 7.

Two minor woodwind instruments: Proficiency Level 4.

Piano: Proficiency Level 2.

The recommended distribution of the required courses is the same as in the *Applied Curriculum — Band or Orchestra Instrument*, with the following changes:

1. Substitution of 4 hours in Music 110 or 2 hours in Music 115 for the 6 hours of electives during the second year.
2. Addition of 2 hours in Music 110 to the courses in the third year (increasing the total for the curriculum to 134).
3. Substitution of 4 hours in Music 110 for the 4 hours of music electives in the fourth year.

Theory-Composition, Theory-Music History

The Theory-Composition Curriculum concentrates on developing skills in musical analysis, composition, and arranging. Students pursuing the Theory-

Music History Curriculum find more emphasis on history and less on musical composition.

Students in these curricula will satisfy the 8 credit hour requirement for participation in a performing organization through registration in Music 100-105, 115, or 234 (Band, Orchestra, Choral Union, University Choir, Chamber Music, or Collegium Musicum), with at least 4 hours being earned in a major performing group (Music 100-105). Majors in these curricula must present two solo performances on the major instrument in student recitals before graduation.

THEORY-COMPOSITION CURRICULUM

An average of at least B in the required freshman and sophomore theory courses (Music 61-68) or the consent of the Coordinator of Theory-Composition is required for continuation in this curriculum. A theory-composition major should enter as a freshman having achieved Proficiency Level 4 on the student's major instrument, and must complete Proficiency Level 8 on that instrument before graduation. If piano is not the major instrument, Proficiency Level 4 in this instrument also must be established. A total of 16 hours of courses from Core groups B and C is required, with no less than 6 hours earned in either group. Another language may be substituted for the indicated French, German, or Italian with the approval of the Coordinator of Theory-Composition. The Major Project (Music 266) must be in theory or composition. A recommended distribution of the required courses in this curriculum:

FIRST YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music elective	2	Music elective	2
Music 61, 62	4	Music 63, 64	4
Music 100-105, or 115	1	Music 31	1
Engl. 1	3	Music 100-105, or 115	1
P.E. 1	1	Engl. 2	3
Core B or C	3	P.E. 2	1
		Core B or C	3
	16		17

SECOND YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music elective	2	Music elective	2
Music 65, 66	4	Music 67, 68	4
Music 33	2	Music 34	3
Music 160	2	Music 160	2
Music 100-105, or 115	1	Music 100-105, or 115	1
French, German, or Italian 1	3	French, German, or Italian 2	3
	16		17

THIRD YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music elective	2	Music elective	2
Music 171	2	Music 172	2
Music 263	2	Music 264	2
Music 265	3	Music 260	2
Music 260	2	Music 100-105 115, or 234	1
Music 100-105, 115, or 234	1	French, German, or Italian 4	3
French, German, or Italian 3	3		
	17		14

FOURTH YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2
Music elective	2	Music elective	4
Music 51	1	Music 51	1
Music 260	2	Music 266	2
Music 231, 235-237	3	Music 232, 235-237	3
Music 100-105, 115, or 234	1	Music 100-105, 115, or 234	1
Core B or C	6	Core B or C	4
	17		17

Total: 131 hr.

THEORY-MUSIC HISTORY CURRICULUM

A maximum of 16 hours of applied music credit (Music 110) will be counted toward the required Proficiency Level 7 on the major instrument. If the student's major instrument is not Piano, up to 12 of the elective credit hours may be used to achieve the required Proficiency Level 4 in that instrument. A student wishing to take more than 6 of the elective credit hours in non-music courses or to substitute a foreign language other than French, German, or Latin may do so only with the consent of the Coordinator of Music History and Literature. The Major Project (Music 266) must be in theory or music history. A recommended distribution of the courses required in this curriculum:

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Elective	2	Elective	2	Elective	2	Elective	2
Music 61, 62	4	Music 63, 64	4	Music 65, 66	4	Music 67, 68	4
Music 100-105,		Music 100-105,		Music 33	2	Music 34	3
or 115	1	or 115	1	Music 100-105,		Music 100-105,	
Engl. 1	3	Engl. 2	3	or 115	1	or 115	1
P.E. 1	1	P.E. 2	1	French, German,		French, German,	
Core B	3	Core B	3	or Latin 1	3	or Latin 2	3
		Music 31	1	Core B	3	Core B	3
	16		17		17		18

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Elective	2	Elective	2	Music 160	2	Music 160	2
Music 171	2	Music 172	2	Music 237	3	Music 266	2
Music 263	2	Music 264	2	Music 100-105,		Music 100-105,	
Music 265	3	Music 232	3	115, or 234	1	115, or 234	1
Music 231	3	Music 100-105,		Lit. (English		Literature or	
Music 100-105		115, or 234	1	or Foreign)	3	Art Apprec.	3
115 or 234	1	French, German,		Core C	4	Core C	4
French, German,		or Latin 4	3				
or Latin 3	3	Core C	4				
	18		19		15		14

Total 134 hr.

Music Education

Students successfully completing a Music Education curriculum will have satisfied course requirements for the Professional Certificate, Grades K-12, and will be eligible for certification to teach both instrumental and vocal music in these grades in the public schools of West Virginia.

In order to qualify for student teaching, a student must have a 2.25 grade-point average in all work attempted, and a 2.0 average in Education courses (C&I 7; Ed. P. 105, 106). Students may be called upon to do their student teaching during either semester of the fourth year, and it may be necessary for student teaching to be done outside Monongalia County.

A student following either Music Education curriculum should enter as a freshman having achieved Proficiency Level 3 on the student's major instrument, and must complete Proficiency Level 7 on that instrument to be eligible

for graduation. The student also must present two solo performances on the major instrument in student recitals before graduation.

The Core requirements must contain the following:

(a) 9 hours in Core A, including Art 30; 3 hours of literature (in English or in another language); and 3 hours in one of the following: religious studies, philosophy, humanities, English composition, linguistics, or foreign language.

(b) 12 hours in Core B, including at least one course in history, and one course in one of the following: sociology, social science, anthropology, or multidisciplinary areas.

(c) 12 hours in Core C, including at least one course in mathematics, and at least one course in science. (Phys. 7 — Physics of Music — is recommended).

MUSIC EDUCATION CURRICULUM — VOCAL EMPHASIS

Students wishing to emphasize preparation in vocal/choral music should choose this curriculum. Those whose major performance area is not voice must complete Proficiency Level 3 in voice; those whose major instrument is not piano must complete Proficiency Level 3 in piano. Hours identified below for "chorus" must include 2 hours of Music 240A — Clinic Chorus — and 4 hours of either Music 102 or Music 105. One semester each of Music 19 and Music 49 is required. A recommended distribution of the required courses in this curriculum follows:

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Music 110	1	Music 110	1	Music 110	2	Music 110	2
Music 61, 62	4	Music 63, 64	4	Music 33	2	Music 34	3
Music 51	1	Music 51	1	Music 65, 66	4	Music 67, 68	4
Chorus	1	Chorus	1	Music 51	1	Music 51	1
Engl. 1	3	Music 31	1	Chorus	1	Chorus	1
P.E. 1	1	Engl. 2	3	Music 19 or 49	2	Music 19 or 49	2
Core	3	Core	3	Core	3	Core	3
		P.E. 2	1				
	16		17		17		18

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 248	2	C&I 104	4
Music 51	1	Music 51	1	Music 48	3	C&I 187	6
Music 151	3	Music 152	3	Art 30	3	C&I 188	6
Chorus	1	Chorus	1	Hl. Ed. 102	2		
C&I 7	2	Ed. P. 106	3	Core	6		
Ed. P. 105	3	Core	6				
Core	6						
	18		16		16		16

Total: 134 hr.

MUSIC EDUCATION CURRICULUM — INSTRUMENTAL EMPHASIS

Students wishing to emphasize preparation in instrumental music (band or orchestra) should choose this curriculum. The 16 hours of applied music (Music 110) in this curriculum are to be used to achieve the following Proficiency

Levels: major instrument, Level 7; voice, Level 1B; piano, Level 2. Those whose major performance area is a keyboard instrument or voice must complete Proficiency Level 4 on a band or orchestra instrument. One semester of Marching Band (Music 100, Sect. 03) and four semesters of a major concert ensemble are required for all wind and percussion players in the curriculum. String players are expected to complete five semesters of orchestra. A recommended distribution of the courses required in this curriculum:

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 110	2	Music 110	2
Music 110	1	Music 110	1	Music 110	1	Music 110	1
Music 100 or 103	1	Music 100 or 103	1	Music 100 or 103	1	Music 100 or 103	1
Music 61, 62	4	Music 63, 64	4	Music 33	2	Music 34	3
Music 51	1	Music 51	1	Music 65, 66	4	Music 67, 68	4
Engl. 1	3	Music 31	1	Music 51	1	Music 51	1
P.E. 1	1	Engl. 2	3	Music 240	1	Music 240	1
Core	3	P.E. 2	1	Music 44-47	2	Music 44-47	2
		Core	3	Core	3	Core	3
	16		17		17		18

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Music 110	2	Music 110	2	Music 115	1	C&I 104	4
Music 100 or 103	1	Music 240	1	Music 240	1	C&I 187	6
Music 151	3	Music 152	3	Music 248	2	C&I 188	6
Music 51	1	Music 51	1	Hl. Ed. 102	2		
Music 44-47	2	Music 44-47	1	Art 30	3		
C&I 7	2	Ed. P. 106	3	Core	9		
Ed. P. 105	3	Core	6				
Core	3						
	17		17		18		16

Total: 136 hr.

Accelerated Curriculums

Students wishing to complete any music curriculum in less than four years may, with the approval of the adviser and the division chairman, accelerate their program by attending summer sessions. All requirements of the four-year curriculum must be satisfied.

Combined Applied-Music Education Curriculum

An optional program can be arranged for students who desire to meet the requirements of majors in both Applied Music and Music Education. Admission to this program is by written consent of the Coordinator of the appropriate applied music area and the Coordinator of Music Education after the student has completed two semesters. This curriculum satisfies the course requirements of the Professional Certificate, Grades K-12.

The numerous possible combinations of Applied Music with Music Education cannot be listed separately here. When the student becomes a candidate for this degree, the student's adviser designates the specific courses which must be taken to satisfy the requirements for both Applied Music and Music Educa-

tion. By attending summer sessions, it may be possible to complete the combined curriculum in four years.

Bachelor of Arts Degree

The Bachelor of Arts program in Musical Arts, an interdepartmental curriculum offered by the College of Arts and Sciences and the Creative Arts Center, provides an option for the student with an interest in music who wishes to pursue a broader liberal arts education, rather than to seek a career as a performer or teacher.

Students wishing to enter this program must have the approval of the program adviser, and must meet audition requirements in the principal performance area, which can be on piano, organ, harpsichord, voice, or band or orchestra instrument.

The flexibility implicit in this program precludes publishing a recommended eight-semester course distribution. Unless otherwise specified, general College of Arts and Sciences and University regulations apply. Three principal areas of course work are required, as shown in the following outline:

A. *General Education*	*Hr.*
English 1, 2	6
Core A, B, C	36
Foreign Language	12
Physical Education	2
Non-Music Electives	14-27
	Minimum — 70
	Maximum — 83

No music courses may be included in Core A.

Of the Core requirement and non-music electives, at least 24 credit hours must be in Arts and Sciences.

Foreign Language study is in addition to the Core requirement.

International Studies or Minority Studies: Each student must meet this requirement of the College of Arts and Sciences.

Depending upon individual interest, students may select courses from areas which could provide a basis for careers in music librarianship (courses in library science), computer science, music merchandising/arts management (courses in psychology, management, marketing) or music criticism (courses in English, journalism).

B. *Musicianship*	*Hr.*
Theory (Music 61-68)	16
Literature (Music 31, 33, 34)	6
Upper-Level Music Electives	3-10
	25-32

Upper-level music electives may include either Music 130, *Music of Appalachia*, or Music 230, *Music of Africa*, which satisfies the International Studies or Minority Studies requirement.

C. *Musical Performance*	*Hr.*
Applied Music (Music 110, major performance area)	16
Concert Organization (Music 100-105) or Ensemble (Music 115)	4
Performance Electives	0-6
	20-26

Student must attain Proficiency Level 7 in the major performance area. Piano proficiency is not required.

Two appearances in upper-level recitals and two semesters of recital attendance are required.

Students who are not making satisfactory progress in achieving applied music proficiency levels will be discontinued.

SUMMARY	*Hr.*
General Education	70-83
Musicianship	25-32
Musical Performance	20-26
Total	Minimum — 128

No more than 42 credits in music courses (exclusive of Applied Music 110) may be counted toward graduation.

At least 30 credits overall must be at the 100-level or above.

A grade-point average of 2.0 is required for graduation.

Courses of Instruction in Music

19. *Introduction to Opera Theatre.* I, II. 0-4 hr.; max. credit 16 hr. PR: Consent. Practical work in all aspects of lyric theatre production. Development of lyric theatre stage technique through movement studies, performance in major and minor roles and operatic scenes, and advanced production techniques.

30. *Appreciation of Music.* I, II. 3 hr. Introductory course designed to develop an appreciation and understanding of the significance of music as a fine art, and to help the student develop intelligent listening habits. *(Not open to music majors.)*

31. *Introduction to Music Listening.* II. 1 hr. Guided listening to important works from all historical periods with emphasis upon the development of awareness of stylistic traits, such as harmonic idiom, melodic structure, tonal movement, texture, rhythm, etc. (*For music majors only.*)

33. *Music Literature.* I. 2 hr. PR: Music 31 or consent. Vocal literature, solo and choral, with emphasis on the hisotrical development of style. Course centered on familiarity with a selected repertory of works presented in historical context.

34. *Music Literature.* II. 3 hr. PR: Music 31 or consent. Similar to Music 33 but devoted to instrumental music. Concentration on music after 1700.

41. *Music As an Art and Science.* I, II. 2 hr. Fundamental music skills and knowledge for elementary classroom teachers. Course includes a piano laboratory arranged. *(Not open to music majors.)*

42. *Music Materials and Procedures.* I, II. 2 hr. PR: Music 30 or equiv. and Music 41. Methods and materials for elementary classroom teachers. Includes a piano laboratory arranged. *(Not open to music majors.)*

44. *Woodwind Instrument Pedagogy.* I, II. 1 hr. (May be repeated once for credit.) Techniques of teaching woodwind instruments, including playing techniques, pedagogical techniques appropriate for young players, methods, materials, maintenance, and repair.

45. *Brass Instrument Pedagogy.* I, II. 1 hr. (May be repeated once for credit.) Techniques of teaching brass instruments, including playing techniques, pedagogical techniques appropriate for young players, methods, materials, maintenance, and repair.

46. *String Instrument Pedagogy.* I, II. 1 hr. (May be repeated once for credit.) Techniques of teaching string instruments, including playing techniques, pedagogical techniques appropriate for young players, methods, materials, maintenance, and repair.

47. *Percussion Instrument Pedagogy.* I, II. 1 hr. Techniques of teaching percussion instruments, including playing techniques, pedagogical techniques appropriate for young players, methods, materials, maintenance, and repair.

48. *Instrumental Pedagogy.* I, II. 3 hr. (For vocal emphasis majors only.) Techniques of teaching band and orchestra instruments, including playing techniques, pedagogical techniques appropriate for young players, methods, materials, maintenance, and repair.

49. *Vocal Pedagogy.* I, II. 2 hr. PR: Two semesters of voice study. Techniques of voice culture, applicable to school choral activities and instruction of young singers.

51. *Conducting and Rehearsing.* I, II. 1 hr. (May be repeated for credit.) Practical experience in conducting and rehearsing choral and instrumental performance groups similar to those found in the public schools.

61. *Aural Theory.* I, II. 2 hr. The four aural theory courses (Music 61, 63, 65, and 67) form a unit of instruction devoted to the development of aural skills such as sight-singing, melodic and harmonic dictation, identification of chords, chord progressions, modulations, and non-harmonic tones. Students work independently with recorded, programmed material.

62. *Written Theory.* I. 2 hr. Elementary theory (scales, keys, intervals) and introduction to diatonic harmony (part-writing and analysis).

63. *Aural Theory.* I, II. 2 hr. PR: Music 61. Continuation of Music 61.

64. *Written Theory.* II. 2 hr. PR: Music 62. Continuation of Music 62. Diatonic harmony including part-writing, harmonization of melodies, and harmonic analysis with triads, dominant seventh chords, and non-harmonic tones.

65. *Aural Theory.* I, II. 2 hr. PR: Music 63. Continuation of Music 63.

66. *Written Theory.* I. 2 hr. PR: Music 64. Continuation of Music 64. Diatonic and chromatic harmony including part-writing, harmonization of melodies, and harmonic analysis with seventh chords, modulations, and foreign chords.

67. *Aural Theory.* I, II. 2 hr. PR: Music 65. Continuation of Music 65.

68. *Analysis of Music.* II. 2 hr. PR: Music 66. Consideration of melody, rhythm, harmony, texture, form, etc., and how they function to produce an organic work of art.

100. *Band.* I, II. 0-1 hr. Wind Ensemble, Concert Band, and Marching Band.

102. *University Choral Union.* I, II. 0-1 hr.

103. *Orchestra.* I, II. 0-1 hr. University-Community Symphony Orchestra, Chamber Orchestra, Opera Orchestra.

105. *University Choir.* I, II. 0-1 hr.

110. *Applied Music.* I, II. 1-4 hr. (May be repeated for credit.) Open to qualified students in any field. Credit given as follows:
1. For music majors, 2 hr. credit for each 30-minute weekly lesson.
2. For others, a maximum of one 30-minute lesson per week for 1 hr. credit.
3. Students in lower grade levels of Applied Music may be grouped in small classes for initial instruction. 1-2 hr. credit.

113. *Diction for Singers.* I, II. 2 hr. (May be repeated for credit; max. credit 8 hours.) PR: Consent. Phonetics, phonetic symbols, and pronunciation in singing in alternating semesters in English; Italian, Latin, Spanish; German; and French. Other aspects of language that will aid in comprehension of song, oratorio, and operatic texts considered.

115. *Chamber Music.* I, II. 0-1 hr. (May be repeated for credit.) PR: Consent. Opportunity to perform in small ensembles.

118. *Methods and Pedagogy.* I. 1-2 hr. PR: Music 110.

119. *Methods and Pedagogy.* II. 1-2 hr. PR: Music 118.

130. *Music in Appalachia.* I. 3 hr. (Not open to B.M. students.) Survey of traditional instrumental and vocal music of southern Appalachia. History, style characteristics,

and performance techniques involving live and recorded examples emphasizing those found in West Virginia.

151. *Music Education.* I. 3 hr. PR: Music 51. Methods, materials, and administration of elementary and secondary music programs. (A weekly laboratory session arranged.)

152. *Music Education.* II. 3 hr. PR: Music 151. Continuation of Music 151 including some opportunities for specialization in the student's primary interest. (A weekly laboratory session arranged.)

160. *Composition.* I, II. 2 hr. PR: Music 68 or consent. (May be repeated for credit; max. credit 8 hr.) Creative writing.

171. *Instrumentation.* I. 2 hr. PR: Music 64. Study of characteristics of band and orchestral instruments and their use in scoring.

172. *Orchestration and Band Arranging.* II. 2 hr. PR: Music 171. Problems in scoring for orchestra ensembles and band.

200. *Directed Music Studies.* I, II, S. 1-4 hr. (May be repeated for credit.) PR: Consent. Studies in applied music, music education, music theory, music history, composition; includes directed or independent study in special topics.

210. *Piano Class Methods and Materials.* I. 3 hr. Methods, materials, and pedagogical techniques, including presentation of keyboard theory as used in functional piano. Practical organization of piano classes. Laboratory: Observation of experienced class teacher and student teaching.

212. *History of Keyboard Pedagogy and Technic.* II. 3 hr. Study of keyboard development and technique, including pedagogical works of the eighteenth through twentieth centuries and application to specific teaching problems. Laboratory: Student teaching and observation, emphasizing analysis and solution of technical problems. *(Course not offered in 1979-80.)*

218. *Repertoire.* I. 0-2 hr.

219. *Repertoire.* II. 0-2 hr.

230. *Music of Africa.* I. 3 hr. Traditional music of selected areas of Africa south of the Sahara with particular reference to East Africa. The diverse musical cultures with emphasis on historical background, instruments, ensembles, forms, styles, and music in its social context.

231. *History of Music.* I. 3 hr. Survey of music history from the pre-Christian era to the baroque. *(Course not offered in 1979-80.)*

232. *History of Music.* II. 3 hr. Survey of music history from the baroque to the contemporary period. *(Course not offered in 1979-80.)*

234. *Collegium Musicum.* I, II. 1-2 hr. (May be repeated for credit.) Performance of outstanding musical works not in the standard repertory. Performance of vocal and instrumental music, investigation of performance practices, preparation of editions, and direction of rehearsals under supervision.

235. *Survey of Vocal Music.* I. 3 hr. PR: Music 33-34 or equiv. and consent. Survey of masses, oratorios, cantatas, and operas from late Renaissance to the twentieth century. Solo repertoire will not be included.

236. *Survey of Instrumental Music.* II, 3 hr. PR: Music 33-34 or equiv. and consent. Survey of instrumental ensemble music, chamber music, concertos, symphonies, and other orchestral music from late Renaissance to twentieth century. Solo repertoire will not be included.

237. *Studies in Contemporary Music.* I. 3 hr. PR: Music 33-34.

240. *Clinic Chorus, Band, and Orchestra.* I, II. 1 hr. Experience in selection, preparation, and class performance of music appropriate for high school choral and in-

strumental groups. Students who have completed four semesters of Music 51 will prepare, teach, and conduct class performances.

243. *Music Workshops.* I, II, S. 1-2 hr. (May be repeated for credit.)

245. *Marching Band Techniques.* I. 2 hr. PR: One semester college marching band experience or consent. Study and practical application of techniques of planning and preparation of school marching band performances.

248. *Music Arranging for Public School Groups.* I, II. 2 hr. PR: Music 66. Practical experience in techniques of making simple, workable arrangements of music for public school choral and instrumental performance groups.

260. *Upper-Division Composition.* I, II. 2 hr. (May be repeated for credit.) PR: Four semesters Music 160, or consent based on scores submitted. Creative writing with emphasis on practical composition for performance.

262. *Counterpoint.* I. 2 hr. PR: Music 68 or consent. Sixteenth century counterpoint.

264. *Counterpoint.* II. 2 hr. PR: Music 68 or consent. Eighteenth century counterpoint.

265. *Analysis of Musical Form.* II. 3 hr. PR: Music 68 or consent. Detailed study of the structure of music.

266. *Major Project in Theory, Composition, or Music History.* I, II. 2 hr. PR: Music 68.

267. *Electronic Music.* I. 2 hr. PR: Music 68 and consent. Technology of producing electronic music. Methods of producing electronic compositions, relationship between sound signal and sound perceived, ear training, analysis of examples from electronic music literature, and composition of electronic music.

268. *Electronic Music.* II. 2 hr. PR: Music 267. Continuation of Music 267.

299. *Recital.* I, II. 0-2 hr. (Not available for Graduate credit.) To be used to fulfill applied major graduation requirement only when student has achieved Proficiency Level 9. Students who have reached Level 6 may receive 1 hour credit, which may not be used to fulfill graduation recital requirement.

310. *Secondary Applied Music.* I, II, S. 1 hr. (May be repeated for credit.) Group or individual instruction on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.

341. *Music in the Elementary School.* I. 3 hr. PR: Music 30, 41, 42, or equiv. Development of skills, procedures, techniques, and materials used by general classroom teacher of music in grades K-8. *(Not open to music majors.)*

342. *Teaching of Music Appreciation.* 3 hr. PR: Music 30, 41, 42, or equiv. Review of information, materials, sources, and techniques involved in teaching appreciation of music in public schools. *(Not open to music majors.) (Course will not be offered in 1979-80.)*

343. *Contemporary Techniques in Classroom Music.* II 3 hr. PR: Music 152 or consent. Principles and practice of contemporary techniques in elementary and junior high school classroom music, including those of Orff and Kodaly.

344. *Appalachian Music for the Classroom.* II. 3 hr. Lecture, demonstration, and practical experience in performance of Applachian vocal and instrumental music, and in use of this music in public school classrooms. May involve field trips and construction of inexpensive instruments.

346. *Music in the Junior High School.* S. 2 hr. PR: Music 151-152 or equiv. Consideration of the potentialities and special needs of the junior high school in music education; programs, procedures, and materials. *(Course will not be offered in 1979-80.)*

Division of Theatre

The Division of Theatre offers a training program in theatre for the student who seeks artistic growth and development. The four-year course of study, leading to the Bachelor of Fine Arts (B.F.A.) degree, is designed to accommodate those students who intend to pursue a professional theatre career as well as those who may enter other fields where theatre skills are desirable.

The various curriculums combine formal classes in theory with practical application and experience in the division's theatre, studio, and shop areas. Public performances offer the student numerous opportunities to develop personal abilities. Productions cover a wide range of world theatre, including new scripts, classical and modern works, and children's and puppet plays.

The theatre major may choose from among several different areas of emphasis, each of which provides a well-rounded knowledge of the art as well as an opportunity to specialize. Graduates of the division are employed in the professional theatre, radio, television, and film; some have chosen careers in fashion design, commercial sales work, make-up, lighting design, and other areas in which theatre skills provide a unique advantage.

University Theatre. The division annually produces, under the name University Theatre, five to seven productions in its two principal performance areas: the Concert Theatre and the Studio Theatre. These productions are open to the public and span a wide range of performance styles.

Summer Repertory Theatre. Three plays, performed in rotation for three weeks during the summer, offer an unusual experience for advanced students to concentrate in the organization and execution of a repertory company.

Project Series. This activity of the division offers an outstanding opportunity for the student actor, designer, director, or playwright to utilize the facilities of the Classroom Theatre as a learning laboratory.

Children's Theatre A children's theatre production is presented each fall for area school children. Productions on a smaller scale are performed throughout the year.

Puppet Mobile. Theatre majors, under the direction of a faculty member, operate a complete puppet theatre program. The division's Puppet Mobile tours the state from September through April.

Bachelor of Fine Arts in Theatre

The Bachelor of Fine Arts (B.F.A.) is conferred upon any student who complies with the general regulations of the University concerning degrees, satisfies all entrance and divisional requirements, and completes one of the curriculums of the Division of Theatre with a 2.0 (C) grade-point average:

A. Acting-Directing-Oral Interpretation
B. Design and Technical Theatre
C. Acting-Voice
D. General Theatre

For admission to the junior year in the Division of Theatre, a student must have established a 2.0 (C) grade-point average.

Transfer students must establish transfer credit from other institutions during the first semester in which they are enrolled in the Division of Theatre. Those electing the Acting-Voice curriculum must arrange an audition in the summer or fall before commencing work in the program.

Students are responsible for correctly fulfilling all requirements. Each student should review the course requirements both before and after every registration period so that errors or omissions will be detected immediately.

Teacher Certification

Although there is no teacher certification with a specialty in theatre, students planning to teach theatre at the high school level will pursue certification in oral communication, which may include course work in theatre.

Theatre Curriculums

The applied program provides a theatre student with a complete experience in all of the basic theatre skills and crafts. In addition to the general scope of the program, the student may select an area of specialization in acting-directing-oral interpretation, acting-voice, design and technical theatre, or general theatre.

ACTING-DIRECTING-ORAL INTERPRETATION

FIRST YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Theatre 51	3	Theatre 50	3
Theatre 75	3	Theatre 76	1
Theatre 95	3	Theatre 100	3
Art 30	3	Core B	3
Engl. 1	3	Engl. 2	3
Dance 17	1	P.E. 25	1
		Core C	4
	16		18

SECOND YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Theatre 101	3	Theatre 102	3
Theatre 110 or 150	3	Theatre 110 or 150	3
Theatre 175	3	Theatre 176	1
Theatre 179	2	Theatre 179	2
Core B	3	Music 30	3
Core C	3	Core C	4
	17		16

THIRD YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Theatre 104 or 103	3	Theatre 103 or 104	3
Theatre 180	3	Theatre 260	2
Theatre 275	3	Theatre 276	1
Theatre 295	3	Theatre 296	3
Theatre elective	3	Theatre electives	6
Core B	3		
	18		15

FOURTH YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Theatre 166	2	Theatre 260	2
Theatre 260	2	Theatre electives	5
Theatre 250 or 251	3	Electives*	7
Core B	3		
Electives	6		
	16		14

Total: 130 hr.

*It is recommended that the free electives be in areas other than theatre.

ACTING-VOICE

FIRST YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Theatre 51	3	Theatre 50	3
Theatre 75	3	Theatre 76	1
Theatre 95	3	Theatre 100	3
Music 110*	2	Theatre 101	3
Music 110*	1	Music 110*	2
Engl. 1	3	Music 110*	1
Dance 17	1	Engl. 2	3
		P.E. 25	1
	16		17

SECOND YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Theatre 110	3	Theatre 104	3
Theatre 166	2	Theatre 176	1
Theatre 175	3	Music 63, 64	4
Music 61, 62	4	Music 110*	2
Music 110*	2	Music 110*	1
Music 110*	1	Core C	3
Core B	3		
	18		14

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Theatre 102	3	Theatre 103	3	Theatre 260	2	Theatre 260	2
Theatre 150	3	Theatre 180	3	Theatre elective	2	Theatre elective	3
Theatre 275	3	Theatre 260	2	Music 110*	2	Music 19	2
Theatre 295	3	Theatre 276	1	Art 30	3	Music 110*	2
Theatre elective	2	Theatre 296	3	Core B	6	Core B	3
Music 110*	2	Music 110*	2			Core C	4
		Core C	4				
	16		18		15		16

Total: 130 hr.

*Student must attain a voice level of 7 and piano level of 2B.

DESIGN-TECHNICAL THEATRE

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	
Theatre 95	3	Theatre 61	2	Theatre 75	3	Theatre 103	3
Theatre 100	3	Theatre 101	3	Theatre 102	3	Theatre 104	3
Art 11	3	Art 12	3	Theatre 110	3	Theatre 163	2
Art 121	3	Art 122	3	Theatre 162	2	Theatre 164	2
Engl. 1	3	Engl. 2	3	Core B	3	Core B	3
P.E. 1	1	P.E. 2	1	Core C	4	Core C	4
		Core C	3				
	16		18		18		17

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Theatre 165	2	Theatre 166	2	Theatre 260	2	Theatre 260	2
Theatre 180	3	Theatre 202	3	Theatre electives	6	Theatre electives	6
Theatre 203	3	Theatre 204	3	Electives*	6	Electives*	6
Theatre 295	3	Theatre 260	2				
Music 30	3	Theatre 296	3				
Core B	3	Core B	3				
	17		16		14		14

Total 130 hr.

*It is recommended that the free electives be in areas other than theatre.

GENERAL THEATRE

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Theatre 51	3	Theatre 50	3	Theatre 102	3	Theatre 104	3
Theatre 75	3	Theatre 101	3	Theatre 110 or 150	3	Theatre 150 or 110	3
Theatre 95	3	Engl. 2	3	Theatre 166	2	Music 30	3
Theatre 100	3	P.E. 25	1	Core B	3	Core B	3
Engl. 1	3	Core B	3	Core C	4	Core C	4
Dance 17	1	Core C	3				
	16		16		15		16

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Theatre 103	3	Theatre 180	3	Theatre 260	2	Theatre 260	2
Theatre 295	3	Theatre 260	2	Theatre electives	6	Theatre electives	6
Theatre elective	3	Theatre 296	3	Electives*	8	Electives*	8
Art 30	3	Theatre electives	6				
Engl. 150	3	Elective*	3				
Core B	3						
	18		17		16		16

Total: 130 hr.

*It is recommended that the free electives be in areas other than theatre.

Courses of Instruction in Theatre (Theat.)

30. *Appreciation of Theatre.* I, II. 3 hr. Develops an appreciation and understanding of theatre as a fine art. *(Open to all students.)*

50. *Oral Interpretation.* I, II. 3 hr. Development of mental and emotional responsiveness to written materials. Techniques of communicating through oral reading. *(Open to all students.)*

51. *Vocal Techniques in Acting.* I. 3 hr. Emphasis of vocal development and voice training for actors.

61. *Sceno-Graphic Techniques.* I, II. 2 hr. Drafting conventions used in the various stages of planning and executing a setting for the theatre.

75. *Acting.* I, II. 3 hr. Basic theories and concepts in stage acting for the beginning student. Emphasis on the physical, intellectual, emotional, and personality languages of acting. *(Open to all students.)*

76. *Actors Studio.* II. 1 hr. PR: Theat. 75 or consent. Laboratory experience in movement, physical control, and pantomime for the actor.

95. *Basic Theatre Concepts.* I. 3 hr. Introduction to theatrical concepts based upon an examination of historical conventions and play analysis.

100. *Stagecraft.* I, II. 3 hr. Lecture course in elementary problems of scenery construction, scene painting, and stage lighting.

101. *Theatre Workshop.* I, II. 3 hr. Development of fundamental skills in the fabrication of scenery and other physical properties for the theatre.

102. *Scene Design.* I, II. 3 hr. Problems of creating stage settings. Consideration of styles of production. Practice in techniques of scene design.

103. *Theatre Lighting Design.* I, II. 3 hr. Basic techniques in stage lighting. Practical experience on University Theatre lighting crews.

104. *History and Design of Costumes.* I, II. 3 hr. Survey of historical stage costuming with basic design including rendering techniques of costumes for the stage.

110. *Theatre Makeup.* I, II. 3 hr. Lecture-laboratory courses in art of stage makeup. Practical makeup for University Theatre productions.

150. *Advanced Oral Interpretation.* I, II. 3 hr. PR: Theat. 50. Content and form of types of literature, and advanced techniques for oral presentation.

162. *Scene Painting.* I, II. 2 hr. Basic techniques used in painting scenery through practical experience in painting theatre productions.

163. *Lighting/Sound Workshops.* I, II. 2 hr. Practical experience in setting up and operating lighting and sound requirements for theatre productions.

164. *Costume Construction.* I, II. 2 hr. Techniques used in construction of theatrical costumes through practical experience in work on theatre productions.

165. *Properties.* I, II. 2 hr. Techniques used in constructing properties through practical experience in work on theatre productions.

166. *Theatre Management.* I, II. 2 hr. Practical experience in operation of a box office and the handling of promotion for theatre productions.

175. *Intermediate Acting.* I. 3 hr. PR: Theat. 75 or consent. Continuation of acting theories and concepts. Emphasis on character portrayal theories.

176. *Actors Studio.* II. 1 hr. PR: Theat. 76, 175 or consent. Laboratory experience in character portrayal and acting techniques through the use of staged scenes.

179. *Directed Theatre Activities.* I, II. 0-3 hr. (May be repeated for a maximum of 6 hr. credit.) PR: Consent. Assigned theatre projects supervised by faculty.

180. *Directing.* I, II. 3 hr. Fundamentals of directing stage plays. Emphasis on work of director in relation to actor, stage, business, composition, movement, and rehearsal schedule.

200. *Directed Theatre Studies.* I, II. 3-12 hr. (May be repeated for credit.) PR: Consent. Studies in theatre history, performance, stage design and technology, and theatre crafts. Subject matter and number of sections varies from semester to semester.

202. *Advanced Scene Design.* II. 3 hr. PR: Theat. 100, 102, or consent. Lecture and laboratory in theories of scene design for stage and television, including actual construction of designs. (Open to junior, senior, and graduate students.)

203. *Advanced Theatre Lighting Design.* I. 3 hr. PR: Theat. 103 or consent. Advanced theories of lighting and design for the stage. Practical experience with advanced lighting equipment.

204. *Advanced Costume Design.* II. 3 hr. PR: Theat. 104 or consent. Individual study in design styles and techniques. Survey of costume design in theatre today.

250. *Advanced Problems in Interpretation.* I. 3 hr. PR: Theat. 50 and consent. Deals with individual problems of advanced students in interpretation.

251. *Professional Reading.* II. 3 hr. PR: Consent. Intensive training in interpretation. Designed to meet needs of the individual. Full-length public recital prepared and presented. Limited enrollment.

260. *Theatre Performance and Rehearsal Laboratory.* I, II. 1-3 hr. (May be repeated for a maximum of 9 hr. credit.) PR: Theatre major and consent. Participation in assigned theatre projects. Appreciation of creativity and performance techniques in theatre.

275. *Advanced Acting.* I. 3 hr. PR: Theat. 75 and consent. Advanced theories in acting to include script and style analysis — modern and historical.

276. *Actors Studio.* II. 1 hr. PR: Theat. 76, 176, 275, or consent. Advanced laboratory experience in acting and production styles of historical and modern theatre through the use of staged scenes.

278. *Repertory Theatre.* 1-6 hr. (May be repeated for a maximum of 12 hr. credit.) PR: Consent. Rehearsal and performance techniques for producing plays in rotating repertory. Emphasis is on the creation of a synthesized company of performers, designers, and technicians.

280. *Advanced Play Directing.* II. 3 hr. PR: Theat. 180 or consent. Emphasis on work of director as an integrating artist. High level of proficiency in direction of a one-act play required of all students enrolled.

281. *Theatre Dialects.* I, II. 3 hr. PR: Consent. Study and mastery of fifteen common dialects used in theatre, motion pictures, and television. *(Course will not be offered in 1979-80.)*

282. *Creative Dramatics.* I, II, S. 3 hr. PR: Theat. 75 or consent. Study and practice of creative dramatic activity as a method of learning and self-development for children.

284. *Puppetry.* I. 3 hr. PR: Theat. 75 or consent. Comprehensive survey of construction and manipulation techniques of puppets. An evaluation of the role of puppetry in child behavior and therapy techniques.

290. *Playwriting.* I, II. 3 hr. PR: Consent. Development of basic playwriting techniques. Specific assignments explore characterization, dramatic event, dialogue, tension, compression. Emphasis on the student finding his own voice, style, and courage to dramatize his view of the world.

291. *Advanced Playwriting.* II. 3 hr. PR: Theat. 290. Further exploration of dramatic technique, with emphasis on orchestrating the longer play. Also touches on script analysis of known dramatic texts and on practical problems of a playwriting career.

295. *Theatre History (Greeks to 1700).* I. 3 hr. Examination of the major theatrical periods from the Greeks to the eighteenth century.

296. *Theatre History (1700 to the Present).* II. 3 hr. PR: Theat. 295. Examination of the major theatrical periods from the eighteenth century to the modern day.

362. *Styles of Production Design.* I. 3 hr. PR: Theat. 295, 296, or consent. Extensive and intensive study of production styles in costume, lighting, and scene design.

375. *Styles of Acting and Directing.* II. 3 hr. PR: Theat. 180 and 280, or consent. Extensive and intensive study of acting and directing styles.

386. *Drama Criticism and Aesthetics.* II. 3 hr. Survey of chief critical and aesthetic theories of theatre — ancient, modern, and contemporary.

School of Dentistry

Dental Hygiene Program

The Dental Hygiene Program is a Department of the School of Dentistry. The four-year dental hygiene curriculum combines the advantages of both a liberal arts and professional education. Upon completion of all requirements and with the recommendation of the School of Dentistry, the candidate is awarded a degree of Bachelor of Science in Dental Hygiene.

The Dental Hygiene curriculum is structured in accordance with standards specified for a dental hygiene program by the Commission on Accreditation of the American Dental Association. The WVU program has been fully accredited by this organization since 1965.

Admission

Students enter dental hygiene as freshmen, and the general admission policies of West Virginia University are followed. The applicant must be a graduate of an accredited high school or preparatory school and have completed one unit of algebra, one unit of geometry, four units of English, biology, and chemistry. Good grades are expected, and applicants should rank in the upper one-third of their graduating class. Particular attention is given to academic achievement in science courses.

The American College Testing Program (ACT) examination is required of high school applicants. High school counselors can supply information concerning this examination. The Dental Hygiene Aptitude Test is required of every applicant. A brochure with detailed information about the test is mailed with application materials, or may be obtained by writing American Dental Hygienists' Association, 211 E. Chicago Ave., Chicago, IL 60611.

In addition to a special application form for dental hygiene, each candidate for admission is supplied with three standardized reference forms. Each applicant is required to have these completed by individuals who know them personally, and have these individuals return the forms directly to the WVU Department of Dental Hygiene.

The personal qualifications, scholastic record, test scores, and recommendation of each applicant are reviewed by the Dental Hygiene Admissions Committee. After reviewing these credentials, the committee may request an interview with the applicant. If this is the case, the applicant is notified by letter of the date, time, and place of the interview. The competition for entrance into dental hygiene is extremely keen. *Nonresidents should recognize that preference in admissions is given to West Virginia residents. Only those nonresidents with the highest qualifications will be considered.*

For application materials the applicant should write to: Department of Dental Hygiene, West Virginia University, or Office of Admissions and Records, WVU Medical Center, Morgantown, WV 26506. Applicants should apply and complete aptitude tests as early as possible in the year preceding the year admission is desired. Applications are available in September and are not accepted after March 1.

(Complete information concerning the Dental Hygiene program at WVU may be obtained in the *WVU Medical Center Catalog.)*

College of Engineering

Engineering is the profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways of economically utilizing the materials and forces of nature for the benefit of mankind.

The western world, and especially the United States, often has been characterized as a technological society. This phrase reflects the great impact that engineering has had on western society. Forecasts of the expected state of the world by the year 2000 suggest that large-scale systems will be created for the development, control, and use of our natural resources and that development will continue in automated manufacturing, synthetic foods, rapid transportation systems, space programs, defense systems, and biosocial systems having to do with medical advances, housing, community development, and pollution control. Engineering will play the major role.

Society's needs in the decades ahead will demand engineering talent on a scale never before seen. The engineer will be called upon, not only to create, but to coordinate technological advances more effectively into large-scale social systems such as vast metropolitan complexes.

The College of Engineering programs are administered through six departments: Aerospace, Chemical, Civil, Electrical, Industrial, and Mechanical Engineering and Mechanics. Its undergraduate programs are recognized by industry as ranking with the best in the nation. The curricula have been planned to give the student a balanced background in the basic sciences, engineering sciences, engineering analysis, humanistic-social studies, and engineering synthesis and design. This blend of science and practice has been designed to give the student the tools to solve today's problems and the background to develop the expertise needed for the future.

The College of Engineering staff uses modern teaching techniques, including programmed material, guest lectures by visiting authorities, seminars, team project assignments, and other techniques to provide a breadth of experience.

Teaching laboratories are equipped with modern instruments, machines, and tools to improve and enrich the student's understanding of engineering principles and problems. Both analog and digital computer laboratories are available for classroom work.

Graduate programs, dedicated to the development of engineering practice, engineering science, and research, are offered in numerous creative specialties. Both master's and doctor's degrees are offered. These exciting programs, where the frontiers of knowledge are explored through study and research, provide an academic environment in which all programs — undergraduate and graduate — are updated constantly to give the student the professional education needed in a technological-scientific society.

ECPD Accreditation

The Engineer's Council for Professional Development (ECPD), a joint body concerned with the enhancement of the status of the engineer and the engineering profession, has been designated by its constituent bodies (American Society of Civil Engineers, American Institute of Mining, Metallurgical, and Petroleum Engineers, American Society of Mechanical Engineers, Institute of Electrical and Electronics Engineers, American Society for Engineering Education, American Institute of Chemical Engineers, American Institute of Aeronautics and Astronautics, National Council of State Boards of Engineering Ex-

aminers, American Institute of Industrial Engineering, and the Engineering Institute of Canada) as the coordinating agency for accrediting undergraduate engineering curricula in the United States.

The undergraduate curricula of the College of Engineering are accredited by the ECPD.

Faculty

Bill L. Atchley, P.E., Ph.D. (Tex. A&M U.), *Dean of College of Engineering.*
George W. Weaver, P.E., M.S.M.E. (WVU), *Assistant Dean of College of Engineering.*
Marian W. Jones, M.S.J. (WVU), *Assistant to Dean.*
Helen L. Plants, P.E., M.S.C.E. (WVU), *Assistant to Dean.*

Engineering Experiment Station — Administration

Bill L. Atchley, P.E., Ph.D. (Tex. A&M U.), *Director.*
L. Zane Shuck, P.E., Ph.D. (WVU), *Associate Director.*
Edward F. Byars, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Mechanical Engineering and Mechanics.*
Walton W. Cannon, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Electrical Engineering.*
Jerome B. Fanucci, Ph.D. (Penn. St. U.), *Professor and Chairman of Aerospace Engineering.*
Curtis J. Tompkins, Ph.D. (Ga. Tech.), *Professor and Chairman of Industrial Engineering.*
Chin-Yung Wen, Ph.D. (WVU), *Professor and Chairman of Chemical Engineering.*
William J. Wilhelm, P.E., Ph.D. (N.C. St. U.), *Professor and Chairman of Civil Engineering.*

Aerospace Engineering

Jerome B. Fanucci, Ph.D. (Penn. St. U.), *Professor and Chairman of Aerospace Engineering.*
Jonathan M. Bennett, *Flight Instructor in Aerospace Engineering.*
John L. Loth, Ph.D. (U. Toronto), *Professor of Aerospace Engineering and Director of Propulsion Laboratory.*
Nathan Ness, Ph.D. (Brooklyn Poly. Inst.), *Professor of Aerospace Engineering.*
G. Michael Palmer, Ph.D. (WVU), *Assistant Professor of Aerospace Engineering.*
William Squire, M.A. (U. Buffalo), *Professor of Aerospace Engineering.*
Richard E. Walters, Ph.D. (WVU), *Professor of Aerospace Engineering and Director of Aerodynamics Laboratory.*
Syed Yusuff, Ph.D. (Brooklyn Poly Inst.), *Professor of Aerospace Engineering.*

Chemical Engineering

Chin-Yung Wen, Ph.D. (WVU), *Professor and Chairman of Chemical Engineering.*
Richard C. Bailie, Ph.D. (Iowa St. U.), *Professor of Chemical Engineering.*
George L. Blackshaw, Ph.D. (N.C. St. U.), *Professor of Chemical Engineering.*
Harold V. Fairbanks, M.S. (Mich. St. U.), *Professor Emeritus of Chemical Engineering.*
Alfred F. Galli, P.E., M.S.Ch.E. (WVU), *Professor of Chemical Engineering.*
Joseph D. Henry, Jr., Ph.D. (U. Mich.), *Professor of Chemical Engineering.*
Marian W. Jones, M.S.J. (WVU), *Instructor in Chemical Engineering.*
J. Christopher Ludlow, Ph.D. (U. Va.), *Assistant Professor of Chemical Engineering.*
Alfred W. Pappano, Ph.D. (WVU), *Associate Professor of Chemical Engineering.*
James B. Riggs, Ph.D. (U. Calif.), *Assistant Professor of Chemical Engineering.*
John T. Sears, Ph.D. (Princeton U.), *Associate Professor of Chemical Engineering.*
Francis H. Verhoff, Ph.D. (U. Mich.), *Associate Professor of Chemical Engineering.*

Civil Engineering

William J. Wilhelm, P.E., Ph.D. (N.C. St. U.), *Professor and Chairman of Civil Engineering.*
Bernard F. Byrne, P.E., Ph.D. (U. Penn.), *Associate Professor of Civil Engineering.*
Edmond B. Collins, M.S.Ag.E. (WVU), *Professor of Civil Engineering and Division Leader, Agriculture, Forestry and Community Development, Center for Extension and Continuing Education.*
Darrell R. Dean, L.L.S., M.S.F. (WVU), *Assistant Professor of Civil Engineering.*
Ronald W. Eck, P.E., Ph.D. (Clemson U.), *Assistant Professor of Civil Engineering.*
Robert N. Eli, Ph.D. (U. Iowa), *Assistant Professor of Civil Engineering.*
Hota V. S. GangaRao, P.E., Ph.D. (N.C. St. U.), *Associate Professor of Civil Engineering.*
William J. Head, Ph.D. (Purdue U.), *Associate Professor of Civil Engineering.*
Charles R. Jenkins, Ph.D. (Okla. St. U.), *Professor of Environmental Engineering.*
Emory L. Kemp, P.E., Ph.D. (U. Ill.), *Professor of Civil Engineering.*
Larry D. Luttrell, P.E., Ph.D. (Cornell U.), *Professor of Civil Engineering.*
Lyle K. Moulton, P.E., Ph.D. (WVU), *Professor of Civil Engineering.*
Edward S. Neumann, P.E., Ph.D. (Northwestern U.), *Associate Professor of Civil Engineering.*
Richard A. Porter, P.E., M.S. (U. Tex.—Dallas), *Assistant Professor of Civil Engineering.*
William A. Sack, P.E., Ph.D. (Mich. St. U.), *Professor of Civil Engineering.*
Roger K. Seals, P.E., Ph.D. (N.C. St. U.), *Professor of Civil Engineering.*
Arthur W. Selders, P.E., M.S.Ag.E. (U. Mass.), *Professor of Civil Engineering and Extension Specialist — Agricultural Engineering.*
John T. Solook, M.P.H. (U. Minn.), *Adjunct Assistant Professor of Civil Engineering.*
Maher K. Tadros, P.E., Ph.D. (U. Calgary), *Assistant Professor of Civil Engineering.*
William L. Wagner, M.S.P.H. (U. N.C.), *Adjunct Assistant Professor of Civil Engineering.*
Robert W. Wheeler, P.E., M.P.H. (Harvard U.), *Adjunct Assistant Professor of Civil Engineering.*
Raul Zaltzman, P.E., M.S.C.E. (U. Okla.), *Professor of Civil Engineering.*

Electrical Engineering

Walton W. Cannon, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Electrical Engineering.*
M. Dayne Aldridge, D.Sc. (U. Va.), *Professor of Electrical Engineering; Acting Director, WVU Energy Research Center.*
Constantine A. Balanis, Ph.D. (Ohio St. U.), *Professor of Electrical Engineering.*
Edwin C. Barbe, M.S.E.E. (WVU), *Assistant Professor of Electrical Engineering.*
Vladimir Chuvychin, Ph.D. (Riga Tech. Inst.), *Visiting Scientist in Electrical Engineering.*
Wils L. Cooley, Ph.D. (Carnegie-Mellon U.), *Associate Professor of Electrical Engineering.*
James F. Corum, Ph.D. (Ohio St. U.), *Assistant Professor of Electrical Engineering.*
Everette C. Dubbe, P.E., B.S.E.E. (S.D. St. C.), *Associate Professor of Electrical Engineering.*
Mark Jerabek, Ph.D. (Purdue U.), *Assistant Professor of Electrical Engineering.*
Edwin C. Jones, P.E., M.S.E.E. (U. Ill.), *Professor Emeritus.*
Robert L. McConnell, P.E., Ph.D. (U. Ky.), *Visiting Assistant Professor of Electrical Engineering.*
Wasfy Mikhael, Ph.D. (Concordia U.), *Associate Professor of Electrical Engineering.*
Sameh A. Mitry, Ph.D. (WVU), *Assistant Professor of Electrical Engineering.*
Janardan Nanda, Ph.D. (Mowcow Inst.), *Visiting Professor of Electrical Engineering.*
Roy S. Nutter, Ph.D. (WVU), *Assistant Professor of Electrical Engineering.*
K. Sankara Rao, Ph.D. (Indian Inst. Tech.), *Assistant Professor of Electrical Engineering.*
Nelson S. Smith, Jr., P.E., D.Sc. (U. Pitt.), *Professor of Electrical Engineering.*
E. Keith Stanek, P.E., Ph.D. (Ill. Inst. Tech.), *Professor of Electrical Engineering.*
Robert E. Swartwout, Ph.D. (U. Ill.), *Professor of Electrical Engineering.*

Lorees Tadros, M.S.E.E. (U. Calgary), *Instructor in Electrical Engineering.*
Subrahmanyam S. Venkata, P.E., Ph.D. (U. S.C.), *Professor of Electrical Engineering.*

Industrial Engineering

Curtis J. Tompkins, Ph.D. (Ga. Tech.), *Professor and Chairman of Industrial Engineering.*
Steven R. Borbash, Ph.D. (U. Pitt.), *Associate Professor of Industrial Engineering.*
Jack Byrd, Jr., P.E., Ph.D. (WVU), *Associate Professor of Industrial Engineering.*
James O'H. Denny, M.L. (U. Pitt.), *Professor of Industrial Engineering.*
Samy E. G. Elias, Ph.D. (Okla. St. U.), *Claude Worthington Benedum Professor of Transportation.*
Robert D. Fowler, P.E., M.S.I.E. (Ga. Tech.), *Professor of Industrial Engineering.*
Donald L. Gochenour, Jr., Ph.D. (WVU), *Associate Professor of Industrial Engineering.*
Wafik H. Iskander, P.E., Ph.D. (Tex. Tech. U.), *Assistant Professor of Industrial Engineering.*
Arup K. Mallik, P.E., Ph.D. (N.C. St. U.), *Assistant Professor of Industrial Engineering.*
Monica T. Mengoli, M.S. (WVU), *Lecturer in Industrial Engineering.*
L. Ted Moore, Ph.D. (Rice U.), *Assistant Professor of Industrial Engineering.*
Ralph W. Plummer, P.E., Ph.D. (WVU), *Associate Professor of Industrial Engineering.*
J. Gerin Sylvia, P.E., M.Ed. (Northeastern U.), *Visiting Professor of Industrial Engineering.*
Betsy G. Wackenhut, M.S. (Purdue U.), *Lecturer in Industrial Engineering.*
Richard E. Ward, P.E., Ph.D. (WVU), *Associate Professor of Industrial Engineering.*

Mechanical Engineering and Mechanics

Chester A. Arents, P.E., M.E. (U. Ore.), *Dean Emeritus.*
Bill L. Atchley, P.E., Ph.D. (Tex. A&M U.), *Professor of Mechanical Engineering and Mechanics.*
Edward F. Byars, P.E., Ph.D. (U. Ill.), *Professor and Chairman of Mechanical Engineering and Mechanics.*
Richard A. Bajura, Ph.D. (U. N. Dame), *Professor of Mechanical Engineering and Mechanics.*
Carl H. Cather, P.E., M.S.M.E. (U. Ill.), *Professor Emeritus.*
Thomas L. Eddy, P.E., Ph.D. (U. Minn.), *Associate Professor of Mechanical Engineering and Mechanics.*
Hasan T. Gencsoy, P.E., M.S.M.E. (WVU), *Professor of Mechanical Engineering and Mechanics.*
Russell R. Haynes, P.E., Ph.D. (WVU), *Associate Professor of Mechanical Engineering and Mechanics.*
John T. Jurewicz, Ph.D. (Wash. St. U.), *Assistant Professor of Mechanical Engineering and Mechanics.*
R. Bruce Martin, Ph.D. (WVU), *Assistant Professor of Mechanical Engineering and Mechanics; Assistant Professor of Orthopedic Surgery, School of Medicine.*
Charles A. Moffatt, P.E., Ph.D. (Tulane U.), *Assistant Professor of Mechanical Engineering and Mechanics.*
In-Meei Neou, Ph.D. (Stanford U.), *Professor of Mechanical Engineering and Mechanics.*
Helen L. Plants, P.E., M.S.C.E. (WVU), *Professor of Mechanical Engineering and Mechanics.*
William R. Powell, Ph.D. (Stanford U.), *Associate Professor of Mechanical Engineering and Mechanics.*
Sidney H. Schwartz, Ph.D. (U. So. Calif.), *Professor of Mechanical Engineering and Mechanics.*
John F. Seeberger, II, B.S. (Loyola C., Md.), *Lecturer in Mechanical Engineering and Mechanics.*
L. Zane Shuck, P.E., Ph.D. (WVU), *Professor of Mechanical Engineering and Mechanics.*
Robert D. Slonneger, P.E., M.S.M.E. (U. Tex.), *Professor of Mechanical Engineering and Mechanics; Associate Chairman.*

John E. Sneckenberger, Ph.D. (WVU), *Assistant Professor of Mechanical Engineering and Mechanics.*
Emil J. Steinhardt, Ph.D. (U. Pitt.), *Associate Professor of Mechanical Engineering and Mechanics.*
Wallace S. Venable, D.Ed. (WVU), *Assistant Professor of Mechanical Engineering and Mechanics.*
George W. Weaver, P.E., M.S.M.E. (WVU), *Professor of Mechanical Engineering and Mechanics.*
Donald T. Worrell, P.E., M.S.E. (WVU), *Professor of Mechanical Engineering and Mechanics.*

Freshman Program

Charles E. Wales, P.E., Ph.D. (Purdue U.), *Professor of Engineering and Education; Director, Freshman Program.*
Thomas R. Long, Ed.D. (WVU), *Associate Professor; Assistant Director, Freshman Program.*

Admission

For admission to the College of Engineering, prospective students must be qualified for admission to WVU, present credit for 2 units of algebra and 1 unit of geometry, and ½ unit of trigonometry or advanced mathematics. Students who do not meet these requirements in mathematics may apply for admission as pre-engineering students in the College of Engineering. All applications should be sent to Office of Admissions and Records, WVU, Morgantown, WV 26506.

Students desiring to transfer from another college, school, or university into the College of Engineering must meet the following requirements:

(A). Have a grade-point average of 2.0 or higher for all college level courses.

(B). Have a grade-point average of 2.0 or higher for all mathematics courses.

Complete information concerning WVU admission, registration, fees and expenses, and regulations may be obtained in Part 2 of the *Undergraduate Catalog.*

Requirements for Degrees

Any student, to be eligible to receive a bachelor's degree in any branch of engineering for which degrees are offered, in addition to satisfying all entrance requirements, shall be required to complete satisfactorily the number of semester hours of work as specified in the curriculum of the department leading to the degree for which the student is a candidate, plus the general requirements of physical education and English proficiency by WVU for such a degree.

In order to receive a degree in the College of Engineering, a student must be registered in his or her major department during the final semester in residence. In the case of dual degrees, completion out of residence, or other exceptions, arrangements must be made with the chairman of the major department at least four months before the expected graduation date.

Credit Hour Limitation

The maximum student credit load is 20 hours per semester without prior approval of the Committee on Academic Standards.

College of Engineering Curricula

The curricula are set up to give, in the first two years, a well-rounded training in the basic sciences of mathematics, chemistry, and physics, and in English. This is followed by such technical subjects as mechanics, thermodynamics, and electricity. The degree of emphasis varies somewhat with the curriculum followed. These courses bridge the gap between the pure sciences and the professional courses. Courses in the humanities are given throughout the four years.

In the third and fourth years, special emphasis is placed on the professional work of the engineer. In these years a certain number of credit hours are available for electives.

The curricula lead to:

1. The degree of Bachelor of Science in Aerospace Engineering.
2. The degree of Bachelor of Science in Agricultural Engineering.
3. The degree of Bachelor of Science in Chemical Engineering.
4. The degree of Bachelor of Science in Civil Engineering.
5. The degree of Bachelor of Science in Electrical Engineering.
6. The degree of Bachelor of Science in Industrial Engineering.
7. The degree of Bachelor of Science in Mechanical Engineering.

(New students *have not been admitted* to the Agricultural Engineering program since September 1, 1976.)

Curriculum in Aerospace Engineering

Degree: Bachelor of Science in Aerospace Engineering

Aerospace engineering embraces the science and technology of high speed ground vehicles and vehicles not necessarily bound to the earth. This includes all types of aircraft, rockets, missiles, and spacecraft, whether flight takes place in the atmosphere, or beyond it.

The aerospace engineering curriculum includes the disciplines encountered in the design of all of these vehicles. The undergraduate student extensively studies the basic principles of fluid mechanics, structures, design, and experimentation, and thus becomes a versatile engineer upon graduation, competent to work in many areas of engineering. The curriculum may serve as a terminal program by incorporating design-oriented courses for the technical electives, or it may be used as a preparatory program for advanced study by the selection of science-oriented courses for these technical electives.

For those students who wish to pursue a career in medicine, dentistry, or related areas, but desire an aerospace engineering degree before entering the appropriate professional school, certain course substitutions may be made. These substitutions include biology (8 hours) and organic chemistry (8 hours), to be substituted for 9 hours of technical electives and 3 hours of heat transfer. This selection will help the student satisfy admission requirements to the professional schools.

AEROSPACE ENGINEERING

FIRST YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Math. 15	4	Math. 16	4
Engl. 1	3	Engl. 2	3
Engineering 1	3	Engineering 2	3
Chem. 15	4	Chem. 16	4
P.E. 1	1	P.E. 2	1
		Non-tech. elect.	3
	15		18

SECOND YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
Math. 17	4	Math. 18	4
Phys. 11	4	Phys. 12	4
M.E.M. 41	3	M.E.M. 43	3
A.E. 10	2	A.E. 11	2
Non-tech. elect.	3	Non-tech. elect.	3
	16		16

THIRD YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
A.E. 111	3	A.E. 112	4
A.E. 160	3	A.E. 140	3
M.E.M. 42	3	A.E. 161	3
M.E.M. 140	3	E.E. 106	4
E.E. 105	4	Non-tech. elect.	3
Non-tech. elect.	3		
	19		17

FOURTH YEAR

First Sem.	*Hr.*	*Second Sem.*	*Hr.*
A.E. 110	Cr.	A.E. 120	3
A.E. 115	3	M.E.M. 250	3
A.E. 150	3	Technical elect.	6
A.E. 165	2	Non-tech. elect.	6
Math. elect.	3		
Technical elect.	3		
Non-tech. elect.	3		
	17		18

Non-technical elective Core Curriculum courses must consist of 12 hr. of Group A and 12 hr. of Group B, and at least two subjects in each group; 18 hr. must be core courses on the College of Engineering-approved list.

Two technical electives must be selected from aerospace engineering courses in the 200 or 300 series.

Curriculum in Agricultural Engineering

Degree: Bachelor of Science in Agricultural Engineering

(New students *have not been admitted* to this program since September 1, 1976.)

Agricultural engineering is the application of engineering principles to agriculture. Success in the application of engineering fundamentals to the agricultural industry requires knowledge of both the biological and physical sciences. The purpose of the course is to give the student general training in agricultural and engineering fundamentals. Considerable stress is given to basic requirements of plant and animal life which affect engineering practices, but greater emphasis is placed on a thorough knowledge of those underlying principles and methods which are the foundation of all the engineering professions.

Although the curriculum gives limited opportunity for specialization, agricultural engineering is made up of five major fields: power and machinery, structures and environment, soil and water conservation, electric power and processing, and food engineering.

AGRICULTURAL ENGINEERING

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4	Bioi. 1	4	Agron. 2	4
Engineering 1	3	Engineering 2	3	Math. 17	4	Math. 18	4
Engl. 1	3	Engl. 2	3	Phys. 11	4	Phys. 12	4
Math. 15	4	Math. 16	4	M.E.M. 41	3	M.E.M. 42	3
P.E. 1	1	P.E. 2	1	Non-tech. elect.	3	Non-tech. elect.	3
		Non-tech. elect.	3				
	15		18		18		18

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Econ. 51	3	Agr. E. 201	3	Agr. E. 230	3	Agr.E. 210 or 220	3
E.E. 105	4	Econ. 52	3	Agr. E. 240 or 250	3	Agr.E. 290 or 260	3
M.E.M. 110	3	C.E. 115	3	Agr. Sc. elect.	3	Non-tech. elect.	3
M.E.M. 140	3	M.E.M. 112	3	Non-tech. elect.	3	Technical elect.	6
Math. elect.	3	Non-tech. elect.	3	Technical elect.	3		
		C.E. 1	2				
	16		17		15		15

Forest Engineering Option

(New students *have not been admitted* to this program since September 1, 1976.)

Forest engineering is an option curriculum in agricultural engineering leading to the Bachelor of Science in Agricultural Engineering. The option is intended primarily to prepare engineers for forest production and harvesting industries and for research and development with industries manufacturing forest machinery and equipment. Forest engineering embraces recognition and solution of engineering problems associated with producing, harvesting, handling, and transporting primary forest products to the mill.

The curriculum includes courses in the biological and forestry sciences which enable the student to appreciate and understand the nature of the engineering problems in the forest industries. The curriculum provides some opportunity for specialization. Students interested in employment with companies manufacturing machinery and equipment for the forest industries should emphasize machine design and development. Students desiring employment with forest industries producing and harvesting logs and pulpwood should select elective courses in materials handling and related subjects. The curriculum permits graduates to select from a wide variety of employment opportunities. It contains sufficient depth in certain areas to prepare the student to pursue graduate training for an advanced degree. Industries and government agencies are placing increased emphasis on graduate-level training. Students who have an interest in engineering teaching and/or research should plan to continue their education at the graduate level.

FOREST ENGINEERING

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Engl. 1	3	Engl. 2	3	Biol. 1	4	F. Man. 122	3
Chem. 15	4	Chem. 16	4	Phys. 11	4	Phys. 12	4
Math. 15	4	Math. 16	4	Math. 17	4	Math. 18	4
Engineering 1	3	Engineering 2	3	M.E.M. 41	3	M.E.M. 43	3
P.E. 1	1	P.E. 2	1	Non-tech. elect.	3	Non-tech. elect.	3
		Non-tech. elect.	3				
	15		18		18		17

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
M.E.M. 110	3	F. Man. 12	3	C.E. 1	2	F. Man. 230	3
M.E.M. 140	3	C.E. 115	3	F. Man. 211	4	Math. elect.	3
Biol. 51	2	M.E.M. 112	3	F. Man. 233	4	Non-tech. elect.	3
E.E. 105	4	Wd. Sc. 130	3	Non-tech. elect.	3	Technical elect.	3
Econ. 51	3	Econ. 52	3	M.E.M. 134	3	Agr. E. or For. E. elect.	3
Non-tech. elect.	3	Technical elect.	3	Agr. E. or For. E. elect.	3		
	18		18		19		15

Technical electives must be upper-division engineering courses including agricultural engineering and forest engineering; an exception is For. 226.

Curriculum in Chemical Engineering

Degree: Bachelor of Science in Chemical Engineering

The Chemical Engineering curriculum is designed to give the graduates a broad background of chemical engineering processes and prepare them to become professional engineers.

Students are prepared for positions in operation, development, design, construction, and management of industrial plants. These industries subject raw materials to chemical and physical changes and produce economically desirable products.

In the first three years, basic science, mathematics, and humanities courses are scheduled. Electives are available for specialization in fields such as polymers, nuclear energy, coal conversion, and separations. Practical work on design and synthesis is incorporated into all chemical engineering courses.

The fourth-year senior block introduces the student to the actual practice of chemical engineering. A comprehensive plant design project provides the core for the senior program. Throughout the year the class work emphasizes process dynamics, design of experiments, nature of materials, and professional practice and ethics. Integrated into this block are oral and written technical communications. Humanistic-social and technical electives continue in the senior year.

CHEMICAL ENGINEERING

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Math. 15	4	Math. 16	4	Math. 17	4	Math. 18	4
Engl. 1	3	Engl. 2	3	Phys. 11	4	Phys. 12	4
Engineering 1	3	Engineering 2	3	M.E.M. 41	3	M.E.M. 43	3
Chem. 15	4	Chem. 16	4	Non-tech. elect.	3	Non-tech. elect.	3
P.E. 1	1	P.E. 2	1	Ch.E. 40	3	Ch.E. 41	3
		Non-tech. elect.	3				
	15		18		17		17

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 133	3	Chem. 134	3	Chem. 246	3	Chem. 248	3
Chem. 135	1	Chem. 136	1	Electives	6	Electives	6
Electives	6	Electives	8	Senior Block			
Junior Block				Ch.E. 170	3	Ch.E. 171	3
Ch.E. 110	4	Ch.E. 111	4	Ch.E. 172	3	Ch.E. 175	3
Ch.E. 142	3	Ch.E. 145	3	Ch.E. 180	1	Ch.E. 181	1
				Ch.E. 190	1	Ch.E. 191	1
	17		19		17		17

Electives in the junior and senior years must be selected to complete requirements of non-technical electives (24 hr.), Engineering Science elective (3 hr.), technical electives (5 hr.), and a Mathematics elective or Ch.E. 231 (3 hr.).

A 2.0 grade-point average in required chemical engineering courses is necessary before a student can register in Ch.E. 110, 142, 170, or 171.

Curriculum in Civil Engineering

Degree: Bachelor of Science in Civil Engineering

The primary emphasis of the undergraduate program in Civil Engineering is to educate a professional engineer who will be expected to assume the role of problem solver, decision maker, and technical leader, and one whose educational background will undergird the continuing development required for practice during a forty-year career.

During the four-year program, civil engineering students are given a solid grounding in mathematics, physics, and chemistry to enable them to understand the fundamental principles of engineering. Added to this is extensive development of the fundamentals of environment, soils and materials, structural, and transportation systems engineering. To help the student to understand one's role in the community, to be effective in working in design teams involving other engineers and other professions, to be effective in leadership and decision making and to be effective as a spokesperson, the curriculum attempts to give the student a meaningful educational experience in the humanities, English and economics. Some specialization is available through electives in advanced courses in transportation, sanitary engineering, structures, soil mechanics, or photogrammetry and surveying, which are available in civil engineering or related departments.

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Se.*	*Hr.*
Math. 15	4	Math. 16	4	Math. 17	4	Math. 18	4
Engl. 1	3	Engl. 2	3	Phys. 11	4	Phys. 12	4
Engineering 1	3	Engineering 2	3	M.E.M. 41	3	M.E.M. 42	3
Chem. 15	4	Chem. 16	4	Geol. 1	1	M.E.M. 43	3
P.E. 1	1	P.E. 2	1	Non-tech. elect.	3	Non-tech. elect.	3
		Non-tech. elect.	3			C.E. 90	1
	15		18		17		18

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sec.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
C.E. 101	4	C.E. 120	4	C.E. 131	4	Tech. elect.	3
C.E. 110	4	C.E. 147	3	C.E. 146	3	C.E. 195	CR
C.E. 160	3	C.E. 169	3	C.E. 195	CR	C.E. 291	3
C.E. 195	CR	C.E. 180	4	C.E. 260	3	Eng'g. Sci. elect.	3
Econ. 54	3	C.E. 195	CR	Non-tech. elect.	3	Non-tech. elect.	9
I.E. 277	3	Eng'g. Sci. elect.	3	Tech. elect.	3		
	17		17		16		18

Non-technical electives must be selected to meet University Core Curriculum requirements and College of Engineering humanistic course requirements.

Technical electives must be approved by the Department of Civil Engineering and may be selected from the basic sciences, engineering science, or engineering analysis and design areas.

Engineering science electives are selected from: A.E. 111, Agr. E. 240, E.E. 105 and 106, M.E.M. 200 and 222, either M.E.M. 101 or 140, and M.E.M. 141.

Curriculum in Electrical Engineering

Degree: Bachelor of Science in Electrical Engineering

The curriculum in electrical engineering has been developed to give the student general training in engineering fundamentals and broad training in the field of electrical engineering. Some special training is available in the following fields as electives in the senior year: electric power, communications, control, solid state electronics, microwaves, antennas, and computing systems.

In the first two years of electrical engineering, work is limited to those subjects which are essential as preparatory courses for more technical courses in the third and fourth years. Fundamental courses in electrical engineering are introduced during the second year. In the third and fourth years the curriculum is mainly courses in electrical engineering and electives.

Technical electives are scheduled in the curriculum to permit a student to acquire more depth in the student's preferred area of electrical engineering. Thus, electives normally will be selected from 200-level electrical engineering courses. However, the student's adviser may recommend, in some cases, that a student select technical electives from upper-level courses in mathematics, the sciences, or other areas of engineering as a part of the curriculum. Mathematics and engineering science electives are to be selected from department-approved lists.

Students enrolled in the Department of Electrical Engineering will not be permitted to register for any electrical engineering courses until they have attained a grade of C or better in each of the electrical engineering courses which are prerequisite to that course. This rule is intended to insure that the student has mastered prerequisite material before advancing to more difficult material.

To be eligible for graduation in electrical engineering a student must attain a grade-point average of 2.0 or better for all electrical engineering courses attempted except for those courses in which a grade of W or WU was received. This rule serves the purpose of assuring that the student has demonstrated overall competence in the chosen major.

ELECTRICAL ENGINEERING

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4	E.E. 20	3	E.E. 23	3
Engineering 1	3	Engineering 2	3	Math. 17	4	Math. 18	4
Engl. 1	3	Engl. 2	3	Phys. 11	4	Phys. 12	4
Math. 15	4	Math. 16	4	M.E.M. 41	3	M.E.M. 42	3
P.E. 1	1	Non-tech. elect.	3	Non-tech. elect.	3	Non-tech. elect.	3
		P.E. 2	1				
	15		18		17		17

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
E.E. 125	4	E.E. 126	3	E.E. 131	3	E.E. 218	3
E.E. 140	3	E.E. 130	3	E.E. 154	4	Eng'g. Sci. elect.	3
E.E. 150	3	E.E. 141	3	E.E. 200	0	Non-tech. elect.	6
Econ. 54 (or 51)	3	E.E. 152	4	Non-tech. elect.	3	Tech. elect.	6
Math. or Stat. elect	3	Econ. 55 (or 52)	3	Tech. elect.	6		
	16		16		16		18

Curriculum in Industrial Engineering

Degree: Bachelor of Science in Industrial Engineering

Industrial engineering began in the latter part of the nineteenth century through the efforts of such pioneers as Frederick Taylor and Frank and Lillian Gilbreth. The Gilbreths are best known as leading figures in the book and movie entitled *Cheaper by the Dozen.* These early industrial engineers were concerned with improving the effectiveness of manual industrial operations. They made remarkable savings possible through the use of motion and time studies and methods of analysis. As industries became more complex large scale systems, industrial engineers became concerned with additional areas of concern to management. Industrial engineers became involved in the design of production facilities using plant layout procedures. They also were developing quality control plans which are so important today in providing for consumer protection in product purchases. As production processes became more complex, the industrial engineer became involved in examining the range of manufacturing processes necessary to produce a product and how these can be utilized most effectively. In the late fifties and in the early sixties, the computer became a powerful new tool for use in solving management problems. Once the computer became economical, the industrial engineer became involved in using the computer to solve larger and more complex management problems through the use of such modern management science tools as operations research.

Today's students learn the fundamental principles which were developed years ago; however, the industrial engineering student of the seventies is in-

creasingly more concerned with using the computer to solve industrial and social problems. At the same time, the industrial engineer has become even more involved with the human element of the organization. The industrial engineering area known as human factors is concerned with the individual's health, safety limitations, and capabilities as they relate to the job and the working environment.

The graduating industrial engineer has a versatile degree which can be used in every endeavor of society. Since the industrial engineer is involved in more effective management of organizations, the industrial engineer is not limited to any one industry. Many have found employment in such places as hospitals, farms, banks, retail stores, and virtually every governmental agency. Industries have found their managers must have knowledge of both technical and management problems. The industrial engineer has an excellent blending of these two fields — technology and management. The top management of many of our largest organizations are industrial engineers.

INDUSTRIAL ENGINEERING

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Math. 15	4	Math. 16	4	Math. 17	4	Math. 18	4
Engl. 1	3	Engl. 2	3	Phys. 11	4	Phys. 12	4
Engineering 1	3	Engineering 2	3	M.E.M. 41	3	M.E.M. 42	3
Chem. 15	4	Chem. 16	4	Non-tech. elect.	3	I.E. 100	3
P.E. 1	1	Non-tech. elect.	3	I.E. 20	1	I.E. 213	3
		P.E. 2	1	I.E. 140	3		
	15		18		18		17

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Econ. 51 or 54	3	Econ. 52 or 55	3	I.E. 291	3	M.E.M. 101	3
I.E. 214	3	I.E. 242	3	I.E. tech. elect.**	3	I.E. 292	3
M.E.M. 43	3	I.E. 250	3	E.E. 105	4	I.E. tech. elect.**	3
I.E. 281	3	Non-tech. elect.	3	Eng. Sci. elect.*	3	Non-tech. elect.	3
I.E. 277	3	I.E. 260	3	Non-tech. elect.	3	C.E. 115	3
Non-tech. elect.	3	I.E. 170	3				
	18		18		16		15

Non-technical electives must satisfy requirements in both Group A and B Core Curriculum requirements.

*Engineering science elective — I.E. advisers will have an approved list of courses to satisfy this requirement.

**A student must take one course from each area A and B: Area A — I.E. 249, I.E. 222, I.E. 243; Area B — I.E. 284, I.E. 253, I.E. 259, I.E. 126, I.E. 251.

Note: All students in industrial engineering must take the Engineer-in-Training (EIT) examination before graduation.

Curriculum in Mechanical Engineering

Degree: Bachelor of Science in Mechanical Engineering

Mechanical engineering is a profession in which members work creatively to achieve products and systems for the benefit of mankind. Society today needs mechanical engineers who have the broad outlook needed to solve complex problems. Engineers with the feel for vital human and economical considerations in additional to professional expertise are well rewarded.

Mechanical engineers are problem solvers who are scientifically informed and mathematically minded. Graduates from the mechanical engineering curriculum find employment in a wide range of industries, government agencies, and educational institutions where they are concerned with: the use and economic conversion of energy from natural sources into useful energy for power, light, heating, cooling, and transportation; the design and production of machines to lighten the burden of human work; the planning and development of systems for using energy machines and resources; the processing of materials into products useful to mankind; and the education and training of specialists who deal with mechanical systems.

The mechanical engineering curriculum prepares students to deal effectively with a broad range of engineering problems rather than narrow specialties.

While the undergraduate curriculum is sufficiently broad to permit the graduate to select from a wide variety of employment opportunities, it contains sufficient depth to prepare a student to enter a graduate school to pursue an advanced degree. As modern science and engineering become more complex, the desirability of graduate-level preparation is being recognized by most advanced industries and government agencies.

MECHANICAL ENGINEERING

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4	Math. 17	4	Math. 18	4
Engineering 1	3	Engineering 2	3	Phys. 11	4	Phys. 12	4
Engl. 1	3	Engl. 2	3	M.E.M. 41	3	M.E.M. 42	3
Math. 15	4	Math. 16	4	M.E.M. 30	2	Core	3
P.E. 1	1	P.E. 2	1	Core	3	Core	3
		Core	3				
	15		18		16		17

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
E.E. 105	4	E.E. 106	4	M.E.M. 134	3	M.E.M. 136	3
M.E.M. 43	3	M.E.M. 112	3	M.E.M. 182	2	Prof. elect.	6
M.E.M. 110	3	M.E.M. 141	3	M.E.M. 250	3	Core	9
M.E.M. 140	3	M.E.M. 144	3	Ch.E. 105	3		
M.E.M. 170	3	M.E.M. 180	3	Prof. elect.	3		
				Core	3		
	16		16		17		18

The professional electives (9 hr.) are selected by the student with the advice and approval of the adviser. The courses selected should form a clear and consistent pattern according to the career objectives of the student. Six of the professional elective credits must be selected from courses in the department.

The 24 credit hours of core must be selected from the University Core Curriculum with the approval of the adviser: Core A, 12 hr. and Core B, 12 hr.

All students in mechanical engineering and mechanics will be required to pass an examination on manufacturing processes and machine tools before commencing the fourth year of studies. Information on the content and nature of this examination may be obtained from the student's adviser.

Special Engineering Curricula

Elective Groups for Students in Other Colleges

Candidates for degrees other than engineering degrees, and special students in any department of WVU, are permitted to elect subjects in the College of Engineering, provided, in each case, they have had the specified prerequisite subjects. Students who wish to take a general classical or scientific course of study before taking the engineering curriculum are advised to carry their mathematics as far as called for by the engineering curriculum, and to take some elective work in the College of Engineering.

Partial Curriculum

Students who do not have the time or are otherwise unable to take the full curriculum will be allowed to take a special or partial curriculum, consisting of such studies as they are prepared to take, provided such curriculum shall have been approved by the adviser.

Professional Degrees

Aerospace Engineer (A.E.); Chemical Engineer (Ch.E.); Civil Engineer (C.E.); Electrical Engineer (E.E.); Mechanical Engineer (M.E.)

The professional degree is conferred by the College of Engineering on the basis of practical experience and study in absentia, the presentation of a thesis, and oral final examination. To be eligible, a candidate for a professional degree must have been in active practice of the profession for at least five years since receiving the first degree, and must have been in responsible charge of important work for at least two years. Application for registration as a candidate for a professional degree should be made not later than October 1 in the academic year in which the degree is desired. Regulations and registration forms may be obtained from the Dean of the College of Engineering.

Courses of Instruction in Engineering

Freshman Program (Eng.)

1. *Freshman Engineering Design.* 3 hr. PR or Conc.: Math. 15. Introduction to the concepts of design (analysis, synthesis, evaluation), report writing, conservation of energy, and calculation techniques. 2 hr. rec., 4 hr. lab.

2. *Freshman Engineering Design.* 3 hr. PR: Eng. 1. Design problems, graphical communication, report writing, and engineering mathematics in the student's major department.

General Engineering

111.* *Impact of Technology on Society.* 3 hr. Designed for non-technical students to give insight into the social relevance of technology and engineering in today's culture, this course deals with the broad interface of technology and modern society, with life essentials, communication, manufacturing, etc. Attitudes of scientists, engineers, and others are compared.

260. *Assessment of Energy Systems.* 3 hr. A comparative study of energy systems for use in meeting the energy demands of the nation. Conversion processes for utiliz-

*May be taken as undergraduate work by students in other colleges and schools.

ing fossil fuel, nuclear, geothermal, and solar sources for supplying clean fuels and energy.

Aerospace Engineering (A.E.)

10. *Introduction to Aerospace Engineering I.* I. 2 hr. PR: Math. 15. Introduction to the use of digital computer methods for engineering calculations. Preparation and execution of aerospace engineering oriented computer programs. 2 hr. lec., 2 hr. lab.

11. *Introduction to Aerospace Engineering II.* II. 2 hr. PR: A.E. 10. Continuation of A.E. 10. 2 hr. lec., 2 hr. lab.

100. *Inspection Trip.* (Credit). PR: Senior standing.

111.* *Fluid Dynamics I.* 3 hr. Coreq.: Math. 18. Properties of the fluid medium, dimensional analysis, hydrostatics, kinematics and dynamics of a fluid field, perfect fluid flow about a body, complex potential function, thin airfoil theory, conformal transformation. 3 hr. lec.

112.* *Fluid Dynamics II.* 4 hr. PR: A.E. 111, M.E.M. 140. Finite wing theory. Compressible, nonviscous fluids, isentropic flow, Prandtl-Meyer expansion, shock waves, airfoils in compressible flow, small perturbation theory, viscous effects. 4 hr. lec.

115. *Experimental Fluid Dynamics I.* 3 hr. PR: A.E. 112. Subsonic and supersonic wind tunnel testing methods and practice. Experiments include the following measurements: Pressure distribution of bodies, boundary layer determination, turbulence measurements, force tests, and stability and performance determinations. Corrections for scale and jet boundary effects. Test design, data analysis, and engineering report preparation. 3 hr. lec., 2 hr. lab.

120. *Flight Vehicle Design.* 3 hr. PR: A.E. 140. Preliminary design of flight vehicles with regard for performance and stability requirements, considering aerodynamics, weight and balance, structure arrangement, configuration, guidance, and propulsion effects. Layout drawings and calculations are combined in a preliminary design report. 1 hr. lec., 6 hr. lab.

140. *Flight Mechanics.* 3 hr. PR: A.E. 111. Fundamental concepts of aircraft static and dynamic stability and control. Derivation of general equations of unsteady aircraft motion. Use of aerodynamic transfer functions and automatic control systems introduced. 3 hr. lec.

150. *Flight Vehicle Propulsion.* 3 hr. PR: A.E. 112 or consent. Equilibrium combustion thermodynamics. Quasi one-dimensional flow with friction and total temperature change. Thermodynamics of aircraft engines. Aerodynamics of inlets, combustors, nozzles, compressors, and turbines. Performance of rockets. Ideal rocket analysis. 3 hr. lec.

160. *Flight Vehicle Structures I.* 3 hr. PR: M.E.M. 42. Strength of thin walled structures in bending, shear, and torsion. Strain energy and application of Castigliano's theorem to bending of rings and curved bars, and to analysis of frames. Principle of virtual work and its application to beam and truss deflections and to statically indeterminate structures. 3 hr. lec.

161. *Flight Vehicle Structures II.* 3 hr. PR: A.E. 160. Tension fields and the design of Wagner beam. Buckling of compression structures; bars, sandwich columns, wrinkling in sandwich construction, plates, shells and stiffened panels. Design for minimum weight. Introduction to matrix methods of structural analysis. Failure by fatigue and fracture. 3 hr. lec.

165. *Experimental Flight Vehicle Structures.* 2 hr. PR: A.E. 160. Tension properties and stress-strain curves of materials. Strain gage circuitry. Elastic and inelastic column buckling testing and theoretical comparison. Structural dynamics testing of vibrating beams. Shear tests by torsion, and torsion of thin-walled members. Observa-

*May be taken as undergraduate work by students in other colleges and schools.

tion of photoelastic and Moire fringe pattern techniques, and an introduction to fatigue testing. 1 hr. lec., 3 hr. lab.

170.* *Aviation Ground School.* 3 hr. Nomenclature of aircraft, aerodynamics, civil air regulations, navigation, meteorology, aircraft, and aircraft engines. May serve as preparation for private pilot written examinations. 2 hr. rec., 2 hr. lab.

215. *Experimental Fluid Dynamics II.* 3 hr. PR: A.E. 115. Continuation of A.E. 115 with increased emphasis on dynamic measurements. Shock tube/tunnel and subsonic and supersonic measurements. Experiments include optical techniques, heat transfer to models, and viscous flow measurements. Error analysis of test data. 2 hr. lec., 3 hr. lab. *(Course will not be offered in 1979-80.)*

216. *Applied Aerodynamics.* 3 hr. PR: A.E. 140. Chordwise and spanwise airload distribution for plain wings, wings with aerodynamic and geometric twist, wings with deflected flaps, and wings with ailerons deflected. Section induced drag characteristics. 3 hr. lec.

220. *Guided Missile Systems.* 3 hr. PR: A.E. 112 and/or A.E. 150. Design philosophy according to mission requirements. Preliminary configuration and design concepts. Aerodynamic effects on missiles during launch and flight. Ballistic missile trajectories. Stability determination by analog simulation. Performance determination by digital and analog simulation. Control, guidance, and propulsion systems. Operational reliability considerations. 3 hr. lec. *(Course will not be offered in 1979-80.)*

232. *V/STOL Aerodynamics.* 3 hr. PR: A.E. 112. Fundamental aerodynamics of V/STOL aircraft. Topics include propeller and rotor theory, helicopter performance, jet flaps, ducted fans, and propeller-wing combinations. 3 hr. lec.

234. *Fluid Dynamics III.* 3 hr. PR: A.E. 112. Fundamentals of viscous flow and the Navier-Stokes equation; incompressible laminar flow in tubes and boundary layers; transition from laminar to turbulent flow; incompressible turbulent flow in tubes and boundary layers. 3 hr. lec. *(Course will not be offered in 1979-80.)*

235. *Fluid Dynamics IV.* 3 hr. PR: A.E. 112. One-dimensional non-steady gas-dynamics. Shock tube theory and applications. Fundamentals of supersonic and hypersonic flow and determination of minimum drag bodies. 3 hr. lec. *(Course will not be offered in 1979-80.)*

242. *Flight Testing.* 3 hr. PR: A.E. 140. Applied flight test techniques and instrumentation, calibration methods, determination of static performance characteristics, and introduction to stability and control testing based on flight test of Cessna Super Skywagon airplane. Flight test data analysis and report preparation. 1 hr. lec., 6 hr. lab.

249.* *Space Mechanics.* 3 hr. PR: Math. 18, M.E.M. 52. Flight in and beyond the earth's atmosphere by space vehicles. Laws of Kepler and Orbital theory. Energy requirements for satellite and interplanetary travel. Exit from and entry into an atmosphere. 3 hr. rec.

250. *Advanced Topics in Propulsion.* 3 hr. PR: A.E. 150 or consent. Special problems of thermodynamics and dynamics of aircraft power plants. Chemical rocket propellants and combustion. Rocket thrust chambers and nozzle heat transfer. Nuclear rockets. Electrical rocket propulsion. 3 hr. lec.

260. *Design of Flight Structures I.* 3 hr. PR: A.E. 161. Structural design and analysis of flight vehicle members. Layout and detail design of specified components are required. 1 hr. lec., 6 hr. lab.

265. *Aeroelasticity.* 3 hr. PR: A.E. 160. Vibrating systems of single degree and multiple degrees of freedom, flutter theory and modes of vibration, torsional divergence and control reversal. 3 hr. lec.

*May be taken as undergraduate work by students in other colleges and schools.

280. *Aerospace Problems.* 1-6 hr. Upper division and graduate.

285. *Thesis.* 2-6 hr. PR: Senior standing and consent.

291. *Introduction to Research.* 1-3 hr. PR: Senior standing and consent. Methods of organizing theoretical and experimental research. Formulation of problems, project planning, and research proposal preparation.

292. *Research Problems.* 2-6 hr. PR: A.E. 291 or consent. Performance of the research project as proposed in A.E. 291. Project results are given in written technical reports, with conclusions and recommendations.

300. *Seminar.* Credit. Attendance required of all graduate students at scheduled aerospace engineering seminars.

315. *Fluid Flow Measurement.* 3 hr. PR: A.E. 112 or consent. Principles and measurements of static and dynamic pressures and temperatures, velocity and Mach number and forces. Optical techniques and photography. Design of experiments. Review of selected papers from the literature. 2 hr. lec., 3 hr. lab.

380. *Special Problems.* 2-4 hr. PR: Consent of department chairman. For graduate students in the non-research program. The student will select a specialized field and follow a course of study in that field under the supervision of a counselor.

381. *Specialized Study Program.* 1-6 hr. PR: Consent. Discussion, individual study reports in aerospace engineering.

Agricultural Engineering (Agr.E.)

201. *Farm Structures.* II. 3 hr. PR: M.E.M. 42. Design of structures for housing, recreation, agriculture, forestry, and related rural activities. Structural materials selection will be based on environmental and strength requirements, durability, economics and aesthetic values. 2 hr. rec., 3 hr. lab.

210. *Electric Power.* II. 3 hr. PR: E.E. 105. Design of systems using electrical energy in urban, rural and recreational applications. Electric power generation, safe wiring, lighting, heating, motors, control systems and their application for air conditioning, water and material handling systems. 2 hr. rec., 3 hr. lab.

220. *Agricultural Process Engineering.* II. 3 hr. PR: C.E. 115, M.E.M. 140. Handling and processing of materials. Fluid flow, materials handling, shaping, and grading, heat and mass transfer, drying, refrigeration, processing instrumentation and controls, cost analysis and processing plant analysis. 2 hr. rec., 3 hr. lab.

230. *Farm Power.* I. 3 hr. PR: M.E.M. 140. Application of power sources to stationary and mobile equipment used in forestry and agriculture. Includes engines and power units, transmission, control, man-machine interface, environmental impact and energy input efficiency. 2 hr. rec., 3 hr. lab.

240. *Hydrology.* I. 3 hr. PR: C.E. 115. The hydrologic cycle with emphasis on precipitation and runoff as related to design of hydraulic structures, soil and water conservation, and flood control. 3 hr. rec.

250. *Soil and Water Conservation.* I. 3 hr. PR: C.E. 115. Principles and practices in the development, conservation, utilization and management of soil and water resources. 2 hr. rec., 3 hr. lab.

260. *Properties of Biological and Animal Materials.* II. 3 hr. PR: Biol. 1, M.E.M. 42 or consent. Physical properties of biological materials as related to harvesting, handling and transporting, conditioning, preserving and storing operations. Size, shape, density, moisture content, elastic and viscoelastic properties, strength and aerodynamic response. 2 hr. rec., 3 hr. lab.

280. *Agricultural Engineering Problems.* 1-3 hr. PR: Consent. Special problems relating to agricultural engineering.

290. *Elements of Machinery Design.* II. 3 hr. PR: M.E.M. 140. Analysis of design and management practices for agricultural and forestry production machinery. Traction and stability, power transmission systems, versatility, operational criteria, quality and safety. 2 hr. rec., 3 hr. lab.

340. *Problems in Hydrology.* I. 3 hr. PR: Agr. E. 240. Special problems in hydrograph analysis, hydrologic performance of small watersheds, erosion and sedimentation, hydrometeorological studies, flood runoff and peak discharge, drought, river forecasting, frequency analysis of hydrologic data. 3 hr. rec.

341. *Physical Climatology.* II. 3 hr. PR: Consent. Physical principles underlying the variations and changes in climate, climatic controls, elements of microclimatology, engineering applications and uses of climatic data. 3 hr. rec.

Forest Engineering (For. E.)

281. *Forest Roads.* I. 3 hr. PR: C.E. 1 or 5 or consent. Forest and rural earth-gravel roads. Aesthetic, planning, design, construction and maintenance procedures. Includes topics on surveys, route selection, service standards, curves and grades, cuts and fills, drainage structures, and bridges. 3 hr. rec.

291. *Logging Systems.* II. 3 hr. PR: Wd. Sc. 130 or consent. The engineering and economic aspects of equipment for short- and long-wood logging systems. Equipment and cost analysis, transportation systems, equipment specifications, accident control and safety. 3 hr. rec.

391. *Logging Systems Engineering.* I. 3 hr. PR: Math. 18 or consent. Theory and design of modern forest harvesting systems such as balloon logging, cableways, pipelines and conveyors. Design features of specialized forest harvesting machines and devices. Systems engineering approach to equipment utilization. 3 hr. rec.

392. *Hydraulic Power.* II. 3 hr. PR: Math. 18 or consent. Hydraulic control circuits and design practice, includes components and elements, hydraulic fluid properties, characteristics of control components, feedback control approach and a semester problem of a complete circuit design. 3 hr. rec.

Chemical Engineering (Ch.E.)

40. *Material and Energy Balances I.* 3 hr. PR: Math. 15, Chem. 16. Introduction to chemical engineering fundamentals and calculation procedures, industrial stoichiometry, real gases and vapor-liquid equilibrium, heat capacities and enthalpies; material balances and energy balances. 2 hr. rec., 2 hr. calc. lab.

41. *Material and Energy Balances II.* 3 hr. PR: Ch.E. 40. Continuation of Ch.E. 40. 2 hr. rec., 4 hr. calc. lab.

105. *Engineering Materials Science.* 3 hr. PR: Physics 12. Includes a study of the internal structures of metals, ceramics, and organic materials, and the dependence of properties upon these structures. Also, the behavior of materials under conditions involving mechanical stresses, thermal reactions, corrosion, electromagnetic fields, and radiation. 3 hr. rec.

110. *Chemical Engineering Transfer Operations I.* 4 hr. PR: Math. 17, Ch.E. 41. Introduction to fluid flow, heat transfer, and mass transfer in relation to chemical engineering unit operations. Includes shell and macroscopic balances for various separation processes. Equilibrium stage calculations for multistage operations with reflux. Applications including computer techniques. Laboratory demonstrations and experiments. 3 hr. rec., 2 hr. lab.

111. *Chemical Engineering Transfer Operations II.* 4 hr. PR: Ch.E. 110. Continuation of Ch.E. 110. 3 hr. rec., 2 hr. lab.

142. *Chemical Engineering Thermodynamics.* 3 hr. PR: Ch.E. 41, Math. 17. First and second laws of thermodynamics. Thermodynamic functions for real materials. Physical and chemical equilibrium concepts and applications. 3 hr. rec.

145. *Chemical Engineering Transport Analysis.* 3 hr. PR: Ch.E. 110, 142. Development of fundamental relationships for momentum, heat and mass transfer for flow systems to include chemical reactions, interphase transport, and transient phenomena. Development and use of microscopic and macroscopic balance equations. 3 hr. rec.

170. *Chemical Plant Process Design I.* 3 hr. PR: Ch.E. 111, 145. Analysis, synthesis, and design of chemical process units and systems. Professional aspects of the practice of chemical engineering. Includes a comprehensive chemical plant design project. 2 hr. rec., 3 hr. calc. lab.

171. *Chemical Plant Process Design II.* 3 hr. PR: Ch.E. 170. Continuation of Ch.E. 170. 2 hr. rec., 3 hr. calc. lab.

172. *Chemical Reaction Engineering.* 3 hr. PR: Ch.E. 145. Application of material balances, energy balances, chemical equilibrium relations, and chemical kinetic expressions to the design of chemical reactors. 2 hr. rec., 2 hr. lab.

175. *Chemical Process Simulation.* 3 hr. PR: Ch.E. 111, 145. Transient behavior of chemical process flow systems, linearization and stability. Process control system design including frequency response analysis. Analog simulation of process dynamics. 2 hr. rec., 2 hr. lab.

180, 181. *Unit Operations Laboratory.* 1 hr. ea. sem. Conc.: Ch.E. 170, 171. Operation of chemical process engineering equipment; collection, analysis, and evaluation of data; laboratory report preparation. 3 hr. lab.

190, 191. *Chemical Engineering Design Practicum.* 1 hr. ea. sem. Conc.: Ch.E. 170, 171. Practical application of process and equipment design methods of chemical engineering.

197. *Thesis.* 2-5 hr. Open only to qualified seniors. A problem in chemical engineering or industrial chemistry is selected for investigation. A carefully prepared report is required. 6-15 hr. lab.

224. *Process Development.* 3 hr. PR: Chem. 134, Ch.E. 111, 145 or consent. Coal conversion process systems from the modified unit operations-unit process concept. Thermodynamics and kinetics in evaluation of system requirements and performance. 3 hr. rec.

231. *Mathematical Methods in Chemical Engineering.* 3 hr. PR: Math. 18. The classification and solution of mathematical problems important in chemical engineering. Treatment and interpretation of engineering data. Analytical methods for ordinary and partial differential equations including orthogonal functions and integral transforms. 3 hr. rec.

251. *Metallurgical Engineering.* 3 hr. PR: Phys. 12. Principles of production of metals and alloys, plastic deformation of metals, corrosion and metal failure. 3 hr. rec.

258. *Polymers and Polymer Technology.* 3 hr. PR or Conc.: Chem. 134. Polymers and their handling. Properties of macromolecules as influenced by molecular weight, polymerization methods, plastics technology, polymer engineering. 3 hr. rec.

270. *Strategy of Process Engineering.* 3 hr. PR: Ch.E. 111 or consent. Latest theories of process design and process optimization, proven through regular use by practicing engineers, are applied to the major problems of process engineering. 3 hr. rec.

280. *Chemical Engineering Problems.* 1-6 hr. For juniors, seniors, and graduate students. May be used to correct deficiencies before or following courses such as Ch.E. 170 and 171, or for other students desiring to take only a portion of a course.

290. *Introduction to Nuclear Engineering.* 3 hr. PR: Junior standing. Introduction to fundamental principles and applications of nuclear technology in science and engineering fields. Studies of nuclear fission and the design and operation of nuclear reactor systems; uses of radioisotopes as power sources and in materials processing, testing and medicine; health physics and radiation detection and shielding.

301. *Transport Phenomena.* 3 hr. PR or Conc.: Ch.E. 231 or equiv. Introduction to the equations of change (heat, mass and momentum transfer) with a differential balance approach. Use in Newtonian flow, turbulent flow, mass and energy transfer, radiation, convection. Estimation of transport coefficients. 3 hr. rec.

307. *Distillation.* 2-5 hr. PR: Math. 18 and consent. Vaporization principles of separation of liquid mixtures, steam, batch, continuous, azeotropic, extractive, and molecular distillation. 3 hr. rec., 0-6 hr. lab. *(Course will not be offered in 1979-80.)*

323. *Advanced Process Development.* 3 hr. PR: Consent. Extended and generalized unit process and operation concepts; specialized synthetic methods; reaction mechanisms and their effects on equipment design and performance; properties, their evaluation, prediction and marketability; industrial toxocology and plant safety. 3 hr. rec.

330. *Process Dynamics and Control.* 3 hr. PR: Consent. Dynamic response of processes and control instruments. Use of Laplace transforms and frequency response methods in analysis of control systems. Application of control systems in chemical reactors, distillation, and heat transfer operations. Introduction to non-linear systems. 3 hr. rec.

344. *Thermodynamics.* 3 hr. PR: Consent. Logical development of thermodynamic principles. These are applied to selected topics including development and application of the phase rule, physical and chemical equilibria in complex systems and non-ideal solutions. Introduction to non-equilibrium thermodynamics. 3 hr. rec.

345. *Chemical Reaction Engineering.* 3 hr. PR: Consent. Homogeneous reactions, batch and flow reactors, ideal reactors, macro and micro mixing, non-ideal flow reactors, heterogeneous reaction systems, catalytic and non-catalytic reactions, reactor stability analysis, reactor optimization. 3 hr. rec.

358. *Polymer Processing.* 3 hr. PR: Chem. 134 or consent. Analytical description of rheology, molding, extrusion, bonding, polymer modification operations, and physical properties. 3 hr. rec.

370. *Process Equipment Design I.* 3 hr. PR: Ch.E. 301 or consent. Design, sizing, optimization, and cost estimation of equipment used for heat transfer, emphasis on design techniques, computer design techniques discussed where applicable. 3 hr. rec.

371. *Process Equipment Design II.* 3 hr. PR: Ch.E. 301 or consent. Design and selection of separation processes including crystallization, leaching, extraction, distillation, adsorption, filtration, membrane, and diffusional separation processes. Similarities between separation processes based on mode of operation are emphasized. 3 hr. rec.

390. *Nuclear Reactor Systems I.* 3 hr. PR: Consent. Intended as a first course for graduate students in the area of power reactor systems analysis and design. Includes topics such as neutron interactions with reactor materials, fission, reactor physics, reactor heat generation and removal, and thermal reactor core design.

391. *Nuclear Reactor Systems II.* 3 hr. PR: Ch.E. 390. Continuation of Ch.E. 390. Reactor kinetics, nuclear power economics, and case studies and analyses of the following reactor systems: pressurized-water, boiling water, fast breeder, and gas-cooled power plants.

392. *Interaction of Radiation and Matter.* 1-3 hr. PR: Consent. Types of radiation, energy deposition by radiation, experimental instrumentation, formation and reactions of radiation-chemical species. 1-3 hr. rec. *(Course will not be offered in 1979-80.)*

Civil Engineering (C.E.)

1.* *Surveying.* 2 hr. PR: Math. 4. Elementary theory of measurement of distance, bearing and azimuth direction and difference in elevation. Field work with transit, tape, level and theodolite. Office computation and plotting. 1 hr. rec., 3 hr. lab.

5.* *Land Surveying.* 4 hr. PR: Math. 4. Primarily for forestry students. Theory and practice with compass, transit, level, stadia, and plane table; computations of area; astronomical observations; map plotting. 2 hr. rec., 6 hr. lab.

6.* *Topographic Mapping.* 2 hr. PR: C.E. 5. Primarily for forestry students. Topographic maps; surveys for roads and property lines; U.S. Public Land Surveys; practice in lettering, plotting, and inking of topographic maps. 1 hr. rec., 3 hr. lab.

90. *Introduction to Civil Engineering.* 1 hr. PR: Sophomore or junior standing. Historical foundations of civil engineering and the role of the profession. Basic areas of civil engineering future introduced. Process of integrating the digital computer into service for the civil engineer discussed. 3 hr. rec. and lab.

101. *Survey Engineering.* 4 hr. PR: C.E. 90 or consent. Theory of measurements and errors; introduction to least squares adjustments; field astronomy for determination of latitude and azimuth; horizontal and vertical curves; easement curves; earthwork volumes; triangulation; boundary surveying; omitted measurements; partition of area. 3 hr. rec., 3 hr. lab.

110. *Civil Engineering Materials.* 4 hr. PR: M.E.M. 43 and C.E. 90 or consent. Physical, chemical and molecular properties of materials commonly employed in civil engineering works. Influence of these properties on the performance and use of these materials. Emphasis on laboratory evaluation of properties that control the performance of materials in use and the established criteria for judging suitability of materials for specific applications. 3 hr. rec., 3 hr. lab.

115.* *Fluid Mechanics.* 3 hr. PR: M.E.M. 41. Fluid statics, laminar and turbulent flow of compressible and incompressible fluids, flow measurements, open channel flow, and kinetics of fluids.

120. *Fluid Mechanics and Hydraulics.* 4 hr. PR: M.E.M. 41. Fluid statics, laminar and turbulent flow of compressible and incompressible fluids, flow measurements, water hammer and surging, open channel uniform and nonuniform flow, sediment transport. 3 hr. rec., 3 hr. lab.

131. *Highway Engineering.* 4 hr. PR: C.E. 101 and 180. Highway administration, economics, and finance; planning and design; subgrade soils and drainage; construction and maintenance. Design of a highway. Center line and grade projections, earthwork and cost estimate. 3 hr. rec., 3 hr. lab.

146. *Sanitary Engineering I.* 3 hr. PR: C.E. 120. Hydrology as applied to water and waste systems. Design of water distribution and waste water systems. Study and partial design of water and waste treatment facilities. 2 hr. rec., 3 hr. lab.

147. *Sanitary Engineering II.* 3 hr. PR: Junior standing. Examination of water and waste water, water treatment, waste water treatment and special problems in public health, air pollution, and radioactivity. 2 hr. rec., 3 hr. lab.

160. *Structural Analysis I.* 3 hr. PR: M.E.M. 41 and C.E. 90 or consent. Analysis of axial force moments and shears in statically determinate structures caused by fixed and moving loads. Study of influence lines for frames and trusses. 3 hr. rec.

169. *Introduction to Structural Design.* 3 hr. PR: C.E. 110, 160. Structural design in steel, reinforced concrete, and timber for axially loaded members, members in bending, and members subjected to axial load and bending. 3 hr. rec.

180. *Soil Mechanics.* 4 hr. PR: C.E. 110. Origins and distributions of soils, classification of soils, fundamental soil properties, and stresses in soils. Subsurface exploration.

*May be taken as undergraduate work by students in other colleges and schools.

Foundations design and design and construction of earth structures. 3 hr. rec., 3 hr. lab.

190. *Civil Engineering Problems.* 1-4 hr. For junior and senior students.

195. *Seminar.* Credit. PR: Junior or senior standing. Lectures by noted engineering and engineering-related practitioners and educators. Discussion of matters of mutual concern to students and faculty.

212. *Concrete and Aggregates.* 3 hr. PR: C.E. 110 or consent. Considerations and methods for the design of concrete mixes. Properties of portland cement and aggregates and their influence on the design and performance of concrete mixtures. Test methods for concrete and aggregates and the significance of these tests. 2 hr. rec., 3 hr. lab.

213. *Construction Methods.* 3 hr. PR: C.E. Senior standing. Study of construction methods, equipment, and administration with particular emphasis on the influence of new technology developments. 3 hr. rec.

222. *Open Channel Flow.* 3 hr. PR: C.E. 120. Hydraulic problems associated with natural waterways, man-made waterways, and design of hydraulic structures of open channels. 3 hr. rec.

232. *Principles of Transportation Engineering.* 3 hr. PR: C.E. 131 or consent. Basic approach to the problem of integrated transportation systems from the standpoint of assembly, haul, and distribution means. Analysis of the characteristics of the transport equipment and traveled way. Power requirements, speed, stopping, capacity costs, economics of location and route selection. Future technological developments and innovations. 3 hr. rec.

235. *Railway Engineering.* 3 hr. PR: C.E. 101. Development and importance of the railroad industry. Location, construction, operation, and maintenance. 3 hr. rec.

245. *Properties of Air Pollutants.* 3 hr. PR: Consent. Physical, chemical, biological and social behavioral properties of dusts, droplets, and gases in the atmosphere. Air pollutant sampling and analysis. Planning and operating air pollution surveys. 2 hr. rec., 3 hr. lab.

251. *Public Health Engineering.* 3 hr. PR: C.E. 146 or 147 or consent. Engineering aspects involved in control of the environment for the protection of health and promotion of comfort of man. Communicable disease control, milk and food sanitation, air pollution, refuse disposal, industrial hygiene, and radiological health hazards. 3 hr. rec.

252. *Water Resources Engineering.* 3 hr. PR: C.E. 120. Design of water-resources systems. The interrelationship between economic objectives, engineering analysis, and government agencies. 3 hr. rec.

260. *Structural Analysis II.* 3 hr. PR: C.E. 160. Fundamental theory of statically indeterminate structures. General theory of continuity and iterative and energy methods applied to the analysis of indeterminate beams and frames. 3 hr. rec.

270. *Structural Design I.* 3 hr. PR: C.E. 169 or consent. Reinforced concrete members. Design considerations for concrete bridges and buildings. 2 hr. rec., 3 hr. lab.

271. *Structural Design II.* 3 hr. PR: C.E. 169 or consent. Design of steel bridge and building structures. Welded, riveted, and bolted connections; simple and moment-resistant connections; cost estimates. 2 hr. rec., 3 hr. lab.

281. *Foundations Engineering.* 3 hr. PR: C.E. 180. Soils exploration and the design and analysis of engineering foundations. Emphasis on earth pressures and design of retaining walls, studies of bracing systems, and the elements of shallow and deep foundations for bridges and buildings. Movement of water through soil structures and control of water in excavations. 3 hr. rec.

291. *Comprehensive Project for Civil Engineers.* 3 hr. PR: Senior standing or consent. Application of civil engineering principles, through group studies, to develop a so-

lution for a comprehensive engineering problem. Consideration given to a problem involving all aspects of civil engineering. 2 hr. rec., 3 hr. lab.

307. *Photogrammetry.* 3 hr. PR: C.E. 101. Geometry and interpretation of aerial photography; flight planning; radial-line control; principles of stereoscopy; plotting instruments. 2 hr. rec., 3 hr. lab.

308. *Geodesy.* 3 hr. PR: C.E. 101. Precise base line measurements, triangulation and leveling, geodetic astronomy; figure of the earth, map projections; rectangular coordinate systems; least squares adjustment; gravity. 3 hr. rec.

310. *Bituminous Materials and Mixtures.* 3 hr. PR: C.E. 110 or consent. Manufacture, testing, and nature of bituminous materials. Principles of the design and behavior of bituminous mixtures including the influence of aggregates, temperature, and other variables on the design for stability and durability. Significance of test methods and specifications. Construction practice. 2 hr. rec., 3 hr. lab.

311. *Pavement Design.* 3 hr. PR: C.E. 110, 180. Effects of traffic, soil, environment, and loads on the design and behavior of pavement systems. Design of flexible and rigid pavements, bases, and sub-bases. Consideration of drainage and climate. Pavement performance and performance surveys. 3 hr. rec.

332. *Airport Planning and Design.* 3 hr. PR: C.E. 131 or consent. Financing, air travel demand modeling, aircraft trends, traffic control, site selection, ground access, noise control, geometric design, pavement design, terminal facilities. 3 hr. rec.

333. *Geometric Design of Highways.* 3 hr. PR: Consent. The theory and practice of geometric design of modern highways. Horizontal and vertical alignment, cross-slope, design speed, sight distances, interchanges, and intersections. Critical analysis of design specifications. 2 hr. rec, 3 hr. lab.

334. *Introduction to Traffic Engineering.* 3 hr. PR: C.E. 131 or consent. The purpose, scope, and methods of traffic engineering. Emphasis on the three basic elements of the transportation system, i.e. the human, vehicle, and roadway. Characteristics of each element and interactions between the elements. Laboratory devoted to conducting simple traffic studies, solving practical problems, and designing traffic facilities. 2 hr. rec., 3 hr. lab.

349. *Solid Waste Disposal.* 3 hr. PR: Consent. Study of traditional patterns and problems of solid waste storage, transport, and disposal. Examination of various engineering alternatives with appropriate consideration for air and water pollution control and land reclamation. Analytical approaches to recovery and reuse of materials. 2 hr. rec., 3 hr. lab.

350. *Sanitary Chemistry and Biology.* 3 hr. PR: C.E. 147 or consent. Study of physical and chemical properties of water. Theory and methods of chemical analysis of water, sewage, and industrial wastes. Biological aspects of stream pollution problems. 2 hr. rec., 3 hr. lab.

356. *Principles of Biological Waste Treatment.* 3 hr. PR: C.E. 350 or consent. Examination of biological systems used in waste treatment as to ecology and function. Models used to describe system behavior are developed. Laboratory experiments to understand operation and design of treatment plants. 2 hr. rec., 3 hr. lab.

359. *Basic Radiological Health.* 3 hr. PR: Consent. Fundamentals theory and terminology. Environmental and occupational hazards in the nuclear field. Radioactive waste disposal. Laboratory measurements of radioactivity. 2 hr. rec., 3 hr. lab.

361. *Statically Indeterminate Structures.* 3 hr. PR: C.E. 260 or consent. Advanced topics in indeterminate structural analysis for trusses, nonprismatic members and frames. 3 hr. rec.

363. *Introduction to Structural Dynamics.* 3 hr. PR: Math. 18 and C.E. 361 or 460. General theory for dynamic response of systems having one or several degrees of freedom. Emphasis on the application of dynamic response theory to structural design. 3 hr. rec.

372. *Plastic Design of Steel Structures.* 3 hr. PR: C.E. 260, 271, or consent. Fundamental concepts of inelastic behavior in steel. Analysis of structures for ultimate load. Influence of axial forces, shear forces, and local buckling on the plastic moment. Study of structural connections and deflections. Steel structures design. 3 hr. rec.

373. *Prestressed Concrete.* 3 hr. PR: C.E. 270 or consent. The analysis and design of determinate and indeterminate prestressed beams and frames. 3 hr. rec.

374. *Timber Design.* 3 hr. PR: C.E. 160 or consent. Emphasis on fundamentals of modern timber design and analysis. Topics include a review of wood properties, design of beams, columns, arches, trusses, and pole structures using dimensional lumber, glue-laminated and plywood components. Detailed study of connections using nails, shear connectors, and adhesives. 3 hr. rec.

380. *Soil Properties and Behavior.* 3 hr. PR: C.E. 180 or consent. Soil mineralogy and the physico-chemical properties of soils and their application to an understanding of the behavior of soils. A detailed review of the basic and classical theories of permeability, consolidation, shear strength, and compaction. Prediction of engineering behavior of soils in light of physico-chemical concepts. 3 hr. rec.

381. *Soil Testing.* 3 hr. PR: C.E. 180 or consent. Complements and expands the material covered in C.E. 380 from an experimental standpoint. Experimental studies conducted to demonstrate empirical and theoretical principles. Emphasis on the proper interpretation of experimental results and application of such results to practical problems. 1 hr. rec., 6 hr. lab.

385. *Airphoto Interpretation.* 3 hr. Study of techniques for obtaining qualitative information concerning type, and engineering characteristics of surficial materials. Use of airphoto interpretation for evaluation of engineering problems encountered in design and location of engineering facilities. 3 hr. rec.

Electrical Engineering (E.E.)

20.* *Introduction to Electrical Engineering.* 3 hr. PR: Math. 16. Fundamental definitions and concepts of electrical engineering, units, circuit elements, basic circuit laws, measurement principles, and introduction to network theory. 2 hr. rec., 3 hr. lab.

23.* *Electrical Circuits.* 3 hr. PR: E.E. 20, Math. 18 (or Conc.). Sinusoidal steady state, network theorems. Fourier series and classical network solutions. 2 hr. rec., 3 hr. lab.

105.* *Electrical Fundamentals I.* 4 hr. PR: Math. 18, Physics 12. Fundamental principles of electrical circuit analysis, power and power factor. Fundamentals of magnetic circuits, induced electromotive force, transformers and electrical machines. *(Primarily for non-electrical engineering students.)* 3 hr. rec., 3 hr. lab.

106.* *Electrical Fundamentals II.* 4 hr. PR: E.E. 105. Principles of electronics, electronic devices, amplifiers and models, digital devices and logic circuits, and instrumentation. *(Not open to electrical engineering students.)* 3 hr. rec., 3 hr. lab.

125.* *Signals and Systems I.* 4 hr. PR: E.E. 23 or equiv., Math. 18. Introduction to the basic concepts and analysis of deterministic signals and linear systems utilizing convolution. Fourier Transforms, and Laplace Transforms. Laboratory exercises illustrate the practical application of these concepts. 3 hr. rec., 3 hr. lab.

126.* *Signals and Systems II.* 3 hr. PR: E.E. 125. Introduction to state-space methods, random signals, correlation functions, and spectral density. Concepts and techniques are applied to communication and feedback systems. 3 hr. rec.

130. *Electromechanical Energy Conversion.* 3 hr. PR: E.E. 125, 140. Fundamentals of electromechanical energy conversion, transformers, and rotating machines. 2 hr. rec., 3 hr. lab.

*May be taken as undergraduate work by students in other colleges and schools.

131. *Introduction to Power Systems.* 3 hr. PR: E.E. 130. Analysis of power system elements connected together as an integrated system for the transmission and distribution of electric power. 2 hr. rec., 3 hr. lab.

140.* *Electric and Magnetic Fields I.* 3 hr. PR: Math. 18, Physics 12. Introduction to vector analysis, orthogonal coordinate systems, Maxwell's equations, scalar and vector potentials, electric and magnetic static fields, boundary-value problems, Laplace's and Poisson's equation, electromagnetic static fields. 3 hr. rec.

141. *Electric and Magnetic Fields II.* 3 hr. PR: E.E. 140. Plane waves in lossless and dissipative media, polarization, reflection and refraction of plane waves, lossless and dissipative transmission lines, waveguides, radiation and antennas. 3 hr. rec.

150.* *Electronic Properties of Materials.* 3 hr. PR: E.E. 23 or equiv. Physical principles of electrical charge transport in solids, vacuum, and gases. Application of these principles in the study of diodes, transistors, integrated circuits, and other electronic devices. 3 hr. rec.

152. *Electronics I.* 4 hr. PR: E.E. 125, 150. Principles of operation and application of electronic devices. Development of device models and analysis of their circuit applications. 3 hr. rec., 3 hr. lab.

154. *Electronics II.* 4 hr. PR: E.E. 152. Theory and application of feedback. Power amplifiers and power-processing circuits. Analysis and application of integrated circuit building blocks. Application of linear and digital functional circuits in electronic systems. 3 hr. rec., 3 hr. lab.

200. *Seminar.* (Credit). PR: Senior standing. Special material and projects.

201.* *Electronics for Scientists.* 3 hr. PR: General physics and elementary calculus or consent. Special courses for chemists, physicists, medical researchers, and other research workers having a limited electronics background. Electrical and electronic fundamentals. Application of electronic instrumentation and electrical signal processing. *(Not normally open to engineering students.)* 2 hr. rec., 3 hr. lab.

208. *Power Electronics.* 3 hr. PR: E.E. 130 and E.E. 154 (concurrently) or consent. Application of power semiconductor components and devices to power system problems: power control, conditioning processing, and switching. Course supplemented by laboratory problems. 3 hr. rec.

216. *Fundamentals of Control Systems.* 3 hr. PR: E.E. 125. Fundamental concepts of feedback control system analysis; stability, and design in the frequency, complex variable, and time domains. Includes Nyquist, root locus and state variable concepts, Mitrovic's method and Chen's method. 3 hr. rec.

218. *Engineering Analysis and Design.* 3 hr. PR: E.E. 130, 154, 200. Application of the method of engineering analysis based upon fundamental physical laws, mathematics, and practical engineering consideration. Emphasis on the professional approach to analysis of engineering problems. 3 hr. rec.

230. *Electrical Power Distribution Systems.* 3 hr. PR: E.E. 131 or consent. General considerations; load characteristics; subtransmission and distribution substations; primary and secondary distribution, secondary network systems; distribution transformers; voltage regulation and application of capacitors; voltage fluctuations; protective device coordination. 3 hr. rec.

231. *Electrical Power Systems I.* 3 hr. PR: E.E. 131 or consent. Analytical methods for steady-state performance of power systems. 3 hr. rec.

234. *Power System Stability.* 3 hr. PR: E.E. 231 or consent. Transient stability, acceleration equations, stability criteria. Two machine and multi-machine problem, solutions by digital analysis. Methods of improving stability. 3 hr. rec.

*May be taken as undergraduate work by students in other colleges and schools.

244. *Introduction to Antennas and Radiating Systems.* 3 hr. PR: E.E. 141 or consent. Radiation from current distributions, linear antennas, far field approximations, field equivalence theorems, aperture antennas, antenna arrays, patterns, and gain, and application to specific antenna types. 3 hr. rec.

245. *Microwave Circuits and Devices.* 3 hr. PR: E.E. 141. UHF transmission line theory, impedance matching techniques and charts, general circuit theory of one port and multiports for waveguiding systems, impedance and scattering matrices, waveguide circuit elements, microwave energy sources. Course supplemented by laboratory problems. 3 hr. rec.

252. *Electronics III.* 3 hr. PR: E.E. 152. Linear integrated circuit building blocks applied to such functions as amplification, controlled frequency response, analog-digital conversion, sampling, and waveform generation. 2 hr. rec., 3 hr. lab.

253. *Physical Electronics I.* 3 hr. PR: E.E. 150 or equiv. Properties of semiconductors and electrical conduction processes in solids. Determining the characteristics of discrete electronic devices. Introduction to masers and lasers. 3 hr. rec.

257. *Transistor Circuits.* 3 hr. PR: E.E. 152 or equiv. Analysis and design of mlutistage transistor amplifiers. Methods of handling the interaction between stages. Gain and bandwidth of multistage low-pass and tuned amplifiers. Feedback amplifiers. 3 hr. rec.

264. *Introduction to Communications Systems.* 3 hr. PR: E.E. 126. Introduction to the first principles of communication systems design. Analysis and comparison of standard analog and pulse modulation techniques relative to bandwidth, noise, threshold, and hardware constraints. Communications systems treated as opposed to individual circuits and components of the system. 3 hr. rec.

271. *Logic of Digital Computers.* 3 hr. PR: Consent (Junior standing in electrical engineering.) An introduction to the design of digital networks and computers. Topics include: computer organization, numbering systems and representatives, Boolean or switching algebra, logic design, minimization of logic, sequential networks, and design of digital subsystems. 3 hr. rec.

272. *Introduction to Computer Hardware Architecture.* 3 hr. PR: Consent. Introduction to basic digital systems and computer architecture. Definition of information storage concepts, central processor designs, and input/output concepts. Content addressable memories, microprogrammed control, addressing techniques, interrupts, and cycle stealing. 3 hr. rec.

275. *Pulse Techniques.* 3 hr. PR: E.E. 152. Introduction to the response of electrical networks to non-sinusoidal inputs, analysis of active networks with large signals and the circuits and techniques used in pulse and digital equipment. Students use the University's computing facilities by solving problems using ECAP. No previous programming is needed. 2 hr. rec., 3 hr. lab.

278.* *Analogue Computers.* 3 hr. PR: Math. 18. The theory and operation of analogue computers. Amplitude scaling and time scaling on the computer and application of computer to solution of differential equations. 3 hr. rec.

280. *Electrical Problems I.* 1-3 hr. For junior, senior, or graduate students.

312. *Feedback System Theory.* 3 hr. PR: E.E. 216, 325. Signal flow graphs; sensitivity; return difference; mathematical definition of feedback; effects of feedback; multiple loop systems; multivariate systems. 3 hr. rec.

315. *State Variable Analysis of Systems.* 3 hr. PR: Consent. Matrix theory and linear transformations as applied to linear control systems. The state-space on time-domain study of stability, controllability, observability, etc. 3 hr. rec.

*May be taken as undergraduate work by students in other colleges and schools.

316. *Synthesis of Feedback Systems I.* 3 hr. PR: E.E. 312, 364. Methods of direct synthesis and optimization of feedback systems; Wiener theory; Pontryagin's maximum principles; dynamic programming; adaptive feedback systems. 3 hr. rec.

325. *Advanced Linear Circuit Analysis.* 3 hr. PR: Consent. Systematic formulation of circuit equations. Use of operational techniques to find total solutions. Applications and characterics of the Laplace and Fourier Transforms. Matrix algebra, complex variable theory and state variables are made to circuit analysis and elementary circuit synthesis. 3 hr. rec.

328. *Modern Network Synthesis.* 3 hr. PR: E.E. 325 or consent. Two-terminal network synthesis; Brune and Bott-Duffin syntheses; four-terminal networks; modern filter synthesis; Darlington synthesis; transfer-function synthesis; ladder and lattice synthesis; potential analogy and approximation. 3 hr. rec.

330. *Advanced Electrical Machinery.* 3 hr. PR: E.E. 131 or consent. Theory and modeling of synchronous, induction, and d-c machines; their steady-state and transient analysis. 3 hr. rec.

331. *Electrical Power Systems II.* 3 hr. PR: E.E. 231 or consent. Electrical transients on power systems including traveling waves due to lightning and switching. Principles of lightning protection. 3 hr. rec.

333. *Application of Digital Computers to Power System Analysis I.* 3 hr. PR: E.E. 231 or consent. Incidence and network matrices; algorithms for their formulation; three-phase networks; short-circuit calculations; load-flow studies. 3 hr. rec.

340. *Electromagnetic Fields and Guided Waves I.* 3 hr. PR: E.E. 141 or equiv. Plane waves in dielectrics, conducting, and anisotropic media; polarization; radiation; duality; uniqueness; image theory; equivalence principle; Green's functions; integral equations; plane wave functions. 3 hr. rec.

344. *Advanced Antenna Theory.* 3 hr. PR: E.E. 244 or equiv. Slot horn, reflector, and broadband antennas; coupling between elements; aperture synthesis; adaptive arrays; applications of Fourier transfer methods, high-frequency asymptotic techniques (GTD), moment method, and tensor Green's functions to antenna theory. 3 hr. rec.

350. *Electronic Circuits.* 3 hr. PR: E.E. 154 or equiv. Analysis and design of electronic circuits; low-pass and band-pass amplifiers, single-tuned and double-tuned stages, equal ripple and maximally flat responses. 3 hr. rec.

353. *Physical Electronics II.* 3 hr. PR: E.E. 154 or equiv. Semiconductor surfaces; surface states, space charge and the field effect. 3 hr. rec.

357. *Linear Integrated Circuits.* 3 hr. PR: E.E. 154 or equiv. Techniques of integrated circuit design and fabrication. Development of models descriptive of linear and nonlinear transistor operation. Design and analysis of high frequency tuned, dc, and differential amplifiers. Primarily for students specializing in communication and electronics. 3 hr. rec.

358. *Integrated Logic Circuits.* 3 hr. PR: E.E. 154 or equiv. or consent. Techniques of integrated circuit design and fabrication. Development of transistor model for nonlinear operation. Design, analysis, and comparison of emitter-coupled, direct-coupled, diode-transistor, and transistor-transistor integrated logic circuits. Intended for students specializing in digital circuits. 3 hr. rec.

364. *Communication Theory.* 3 hr. E.E. 264 or consent. Detailed study of probability theory and its use in describing random variables and stochastic processes. Emphasis on applications to problems in communication system design. 3 hr. rec.

366. *Information Theory I.* PR: E.E. 364. Probability concepts; theory of discrete systems; encoding; theory of continuous systems; systems with memory; the fundamental theorem of information theory. 3 hr. rec.

370. *Switching Circuit Theory I.* 3 hr. PR: E.E. 271 or equiv. Course presumes an understanding of the elements of Boolean or switching algebra. Study of both combinational and sequential switching circuits with emphasis on sequential networks. Advanced manual design and computer-aided-design techniques for single and multiple output combinational circuits. Analysis and design of sequential circuits. Detection and prevention of undesired transient outputs. 3 hr. rec.

372. *Advanced Computer Architecture.* 3 hr. PR: E.E. 271 and 272 or consent. Formal tools for designing large digital systems are introduced; formal descriptive algebras such as ISP, PMS, AHPL, CDL, and others. An in-depth study of computer system designs including instruction design and data path design. 3 hr. rec.

373. *Design of Computer Arithmetic Circuits I.* 3 hr. PR: E.E. 271 or equiv. Detailed study of computer circuitry usable in performing binary arithmetic. Logic, circuitry, and engineering aspects of digital computer equipment design. Primary emphasis on design of high speed, parallel arithmetic units using the natural binary number system. Analysis of systems for representing negative numbers. Study of various means for obtaining high speed addition, subtraction, and multiplication. 3 hr. rec.

374. *Design of Computer Arithmetic Circuits II.* 3 hr. PR: E.E. 373. Continuation of E.E. 373. High speed binary division, floating point arithmetic, modular or residue arithmetic, and techniques for checking arithmetic are covered. Recent innovations studied as literature becomes available. 3 hr. rec.

380. *Electrical Problems.* 1-6 hr. For graduate students.

390. *Advanced Independent Study.* 1-6 hr. PR: Consent. Individual investigation in advanced electrical engineering subjects not covered in formal courses.

Industrial Engineering (I.E.)

6. *Welding, Forming, and Heat Treatment.* 2 hr. Molding and casting of non-ferrous metals, oxyacetylene and electric welding, resistance welding of plates, pipes, tubing, etc. Lectures, recitations, demonstrations, and laboratory practice. 6 hr. lab.

7. *Welding and Heat Transfer.* 1 hr. PR: Consent. Practice in cutting and welding steel and cast iron with oxyacetylene and arc welding equipment. Demonstration of different methods of heat treatment. 3 hr. lab.

8. *Machine Work.* 2 hr. Equipment, purpose, and character of operation, methods of holding work, turning, boring, drilling, grinding, and shaping. Use of precision measuring instrument. Two 3-hr. labs.

20. *Fundamentals of Industrial Engineering.* 1 hr. PR: Sophomore standing. An introduction to the basic principles of industrial engineering.

100. *Manufacturing Processes.* 3 hr. Lectures, demonstrations, and laboratory work relating to methods, types of equipment, and character of operations of machining, metals casting, and welding. Engineering application of processes and economic comparisons.

140. *Motion and Time Study.* 3 hr. PR: Sophomore standing. Principles and techniques, job analysis, standardization, and formula construction; stop watch and micromotion analysis of industrial operations; development of production and incentive standards. Human factors. 2 hr. rec., 3 hr. lab.

170. *Accounting for Engineers.* 3 hr. PR: Junior standing. The accounting cycle, journals, and ledgers; fixed assets and depreciation; financial statements. Essentials of cost accounting. Emphasis on utilization of cost data and reports by management, indicating management's control over industrial operations.

213. *Engineering Statistics.* 3 hr. PR or Conc.: Math. 17 or consent. Sample spaces and probability. Normal, binomial, Poisson, and other distributions with engineering applications. Measures of central tendency and dispersion. Tests of significance

and confidence intervals. Introduction to analysis of variance and regression analysis. Engineering applications emphasized.

214. *Analysis of Engineering Data.* 3 hr. PR: I.E. 213. Introduction to linear statistical models. Design and analysis of simpler experimental configurations occurring frequently in engineering studies. Similarities and differences between regression and experiment design models emphasized in a vector-matrix setting. Emphasis on the use of Statistical Analysis System. No computer programming background is assumed on the part of the student.

215. *Statistical Decision Making.* 3 hr. PR or Conc.: I.E. 213. Basic concepts of probability theory. Discrete and continuous distributions, joint and derived distributions, with application to industrial and research problems. Introduction to generating functions and Markov chains.

216. *Industrial Quality Control.* 3 hr. PR: I.E. 213. Principles and methods for controlling the quality of manufactured products, with emphasis on both economic and statistical aspects of product acceptance and process control.

222. *Job Evaluation and Wage Incentives.* 3 hr. PR: I.E. 140 or consent. Principles used in evaluating jobs, rates of pay, characteristics and objectives of wage incentive plans; incentive formulae and curves.

242. *Production Planning and Control.* II. 3 hr. PR: I.E. 100, 140, 213. Planning, scheduling, routing, and dispatching in manufacturing operations and production control systems. Problems in industrial plant design. Layout for operation and control. Space utilization. 3 hr. rec.

243. *Plant Layout and Design.* 3 hr. PR: I.E. 242. Problems in industrial plant design. Equipment location, space utilization, layout for operation and control, flow sheets, materials handling. Allied topics in power utilization, light, heat, and ventilation. 1 hr. rec., 6 hr. lab.

249. *Design of Dynamic Materials Systems.* 3 hr. PR: I.E. 140 or consent. Application of industrial engineering theory and practice to selection of material systems and equipment including efficient handling of materials from first movement of raw materials to final movement of finished product. Present quantitative design techniques.

250. *Introduction to Operations Research.* 3 hr. PR: I.E. 213 or consent. Basic tools and philosophies of operations research. Tools include: linear programming, queueing theory, inventory theory, and simulation. Other operations research techniques presented as they relate to the overall systems philosophy.

251. *Analytical Techniques of Operations Research.* 3 hr. PR: I.E. 213 or consent. Nonlinear optimization techniques useful in operations research and industrial engineering studies. Classical optimization techniques, quadratic, geometric and dynamic programming, branch and bound and gradient techniques.

253. *Applied Linear Programming.* 3 hr. PR: I.E. 250 or consent. Application of the assignment, transportation, and simplex algorithms to typical industrial problems. Methods and computational efficiencies of the revised simplex and other algorithms are also studied.

259. *Introduction to Systems Engineering.* 3 hr. PR: I.E. 250, or consent. Quantitative synthesis of OR models. Definition of terms. Development and testing of assumptions, objectives, and restrictions. Measurement of parameters in the model. Optimization techniques and error sensitivity of the optimal solution. Implementing, utilizing, and updating the model.

260. *Human Factors Engineering.* 3 hr. PR: Consent. Includes the study of ambient environment, human capabilities and equipment design. Systems design for the man-machine environment interfaces studied with emphasis on health, safety, and productivity .

261. *System Safety Engineering.* I. 3 hr. PR: Consent. The concepts of hazard recognition, evaluation analysis and the application of engineering design principles to the control of industrial hazards.

277. *Engineering Economy.* 3 hr. PR: Junior standing. Derivation of compound interest formulas and using them as a tool of decision making. Comparison of various alternatives based on annual costs, present worth, rate of return, benefit-cost ratio before and after income taxes. Depreciation methods, sensitivity analysis, sunk costs, increment costs, retirement, and replacement.

280. *Industrial Engineering Problems.* 1-3 hr. PR: Consent. Special problems.

281. *Digital Computation for Engineers.* 3 hr. Conc.: Math. 16. Introduction to FORTRAN programming for engineering students. Emphasis on development of skills in problem definition and coding. Class projects chosen to illustrate selected numerical and non-numerical processing methods.

282. *Digital Computer Concepts.* 3 hr. PR: I.E. 281 or consent. Principles of digital computer functional components. Study of digital operating systems including structure of the various subsystem components such as monitors, input control systems, and loaders.

283. *Information Retrieval.* 3 hr. PR: I.E. 281 or consent. Tools, elements, and theories of information storage and retrieval. Documentation, information framework; indexing; elements of usage, organization and equipment; parameters and implementation; theories of file organization and system design.

284. *Simulation by Digital Methods.* 3 hr. PR: I.E. 213, 281 or consent. Introduction to digital (Monte Carlo) simulation methods and their application to operations research problems. Student develops computer programs to simulate and analyze practical situations. Interpretation of results emphasized.

291. *Design of Productive Systems I.* 3 hr. PR: Senior standing in industrial engineering. The integration of industrial engineering principles in the design of productive systems. Emphasis in the course will be on the analysis of different systems for productivity management.

292. *Design of Productive Systems II.* 3 hr. PR: Senior standing in industrial engineering. Continuation of I.E. 291.

300. *Special Topics in Manufacturing Processes and Automation.* 3 hr. PR: I.E. 100 or equiv. Special topics concerning manufacturing processes and automation with special emphasis on manufacturing management.

313. *Statistical Methods in Engineering.* PR: Math. 17. Introduction to statistical methods in engineering including probability and random variables, empirical and theoretical distributions, hypothesis tests, and elementary regression analysis.

314. *Design of Industrial Experiments.* 3 hr. PR: I.E. 214 or consent. Continuation of I.E. 214. Complex experimental design especially useful to engineering and industrial researchers, including factorials and optimum-seeking design. Emphasis on use of existing digital computer routines and interpretation of results.

325. *Management Control.* 3 hr. PR: I.E. 170 or consent. Effective techniques for higher management control, including current concepts and controls applicable to production management problems.

338. *Technology Forecasting.* 3 hr. A study of various procedures used in forecasting technological developments.

339. *Technology Assessment.* 3 hr. A study of various procedures used in technology assessment. The implications of technology in various aspects of society stressed.

340. *Fundamentals of Traditional Industrial Engineering.* 3 hr. Basic fundamentals of traditional industrial engineering including methods studies and improvement methods and activity analysis charts, work measurement, job evaluation, plant layout, and materials handling principles.

341. *Methods Analysis and Work Simplification.* 3 hr. Advanced study of techniques of methods analysis, including modern means of methods research. Development of appropriate cost analyses to accompany improved operating plans. Design, installation, and administration of work simplification programs, suggestion systems, and renumeration policies, and means of intraplant communications concerning such programs. 2 hr. rec., 3 hr. lab.

342. *Advanced Production Control.* 3 hr. PR: I.E. 250. Different mathematical models useful in the design of effective production control systems. Various models covered include: static production control models under risk and under uncertainty, dynamic models under certainty, under uncertainty, and under risk.

350. *Survey of Operations Research.* 3 hr. PR: I.E. 213 or consent. Operations research methods for graduate students having no previous background in operations research. Topics include linear programming, project management, queueing theory, inventory theory, and simulation.

354. *Case Studies in Operations Research.* 3 hr. PR: Consent. This course will examine the applications of operations research procedures in a variety of applications. The course examines the factors which lead to successful model building through case studies.

355. *Scheduling and Sequencing Methods.* 3 hr. PR: I.E. 250. Theory and applications of analytical models used in the scheduling of operations. Topics include single machine scheduling models, flow shop models, job shop models, and assembly line balancing methods.

357. *Management Applications of Operations Research.* 3 hr. Contributions which operations research may make in business. Topics include linear programming, simulation, project management, data analysis, and data processing.

358. *Special Topics in Systems Analysis and Operations Research.* 3-6 hr. PR: Consent. Special topics from recent developments in operations research and related fields. Special emphasis on interests of current graduate students.

359. *Operations Research for Public Administrators.* 3 hr. Examination of role of quantitative analysis in public administration and decision making.

360. *Human Factors System Design.* 3 hr. PR: I.E. 260 or consent. Theoretical aspects and practical applications of man/machine relationships as they influence future system design. Student examines human limitations with respect to acceptance of information, decision making, and ability to transmit the result of such decisions to controlled equipment systems to obtain design optimization. 2 hr. rec., 3 hr. lab.

361. *Industrial Hygiene Engineering.* 3 hr. PR: Consent. The recognition of environmental stresses present in man/machine systems and the effect of these stresses on health, safety, and performance of man. Calibration procedures, proper sampling, and field survey techniques stressed.

368. *Advanced Problems in Human Factors.* 1-3 hr. PR: I.E. 260 or 360 and graduate standing. Special problems relating to one of the areas of human factors, such as simulation, controls, vigilance, safety, and occupational health.

377. *Advanced Engineering Economy.* 3 hr. PR: Consent. Special emphasis on depreciation, engineering and economic aspects of selection and replacement of equipment; relationship of technical economy to income taxation, effect of borrowed capital and pricing model. 3 hr. rec.

381. *Integrated Data Processing.* 3 hr. PR: I.E. 281 and consent. Advanced work in electronic data-processing systems and procedures design. Case studies of integrated data-processing systems. Course projects include individual use of a computer in management data-processing analysis problems. 3 hr. rec.

385. *Digital Computer Applications.* 1 hr. PR: Senior standing in engineering, physical science, or mathematics. Special study of selected programming languages.

389. *Special Topics in Industrial Data Processing Systems.* PR: I.E. 281 or consent. Selected topics relating to industrial applications of computer and data processing systems. Emphasis on applications not in the FORTRAN language.

Mechanical Engineering and Mechanics (M.E.M.)

30. *Introduction to Mechanical Engineering.* 2 hr. PR: Math. 15. Conc.: M.E.M. 41. Introduction to principles and techniques in mechanical engineering. 4 hr. lab.

41. *Statics.* 3 hr. PR or Conc.: Math. 16. Engineering applications of equilibrium of forces. Vector operations, couple and moment of force, resultants (2 and 3 dimensions), center of gravity and center of pressure, static friction, free body diagrams, equilibrium, trusses and frames.

42. *Dynamics.* 3 hr. PR: M.E.M. 41; PR or Conc.: Math. 17. Newtonian dynamics of particles and rigid bodies. Engineering applications of equations of motion, work and energy, conservative forces, impulse and momentum, impulsive forces, acceleration in several coordinate systems, relative motion, instantaneous centers, and plane motion.

43. *Mechanics of Materials.* 3 hr. PR: M.E.M. 41; PR or Conc.: Math. 17. Analysis of stress, deformation, and failure of solid bodies under the action of forces. Internal force resultants, stress, strain, Mohr's circle, mechanical properties of engineering materials, generalized Hook's Law. Analysis axial, bending and buckling loads and combinations.

101. *Thermodynamics.* 3 hr. PR: Phys. 12, Math. 17. Principles of thermodynamics; properties of gases and vapors; vapor cycles; internal combustion engines cycles and refrigeration. Not open to students majoring in mechanical engineering. 3 hr. rec.

110. *Dynamics of Machines I.* 3 hr. PR or Conc.: Math. 18, M.E.M. 42. Kinematic analysis and synthesis of linkage, gears, cams, and other basic mechanisms. 2 hr. rec., 3 hr. lab.

112. *Dynamics of Machines II.* 3 hr. PR: M.E.M. 110. Static and dynamic force analysis in mechanical systems. Principles of vibration theory and balancing of rotating machinery. Rigid body motion and gyroscopes. 3 hr. rec.

134. *Mechanical Engineering Design.* 3 hr. PR: M.E.M. 43, 112. Fundamentals of mechanical design. Analysis of stress, deformation and failure modes. Rational design and selection of mechanical elements. Theory of lubrication and wear. Problem formulation and optimization of solutions. 3 hr. rec.

136. *Engineering Systems Design.* 3 hr. PR: M.E.M. 134, 182. Identification and solution of challenging engineering problems through rational analysis and creative synthesis. Planning, designing, and reporting on complex systems on individual and group basis. 6 hr. lab.

140. *Engineering Thermodynamics.* 3 hr. PR: Phys. 11, Math. 17. First and second laws of thermodynamics; energy equations; properties of gases and vapors; availability and thermodynamic relations. 3 hr. rec.

141. *Engineering Thermodynamics.* 3 hr. PR: M.E.M. 140. Continuation of M.E.M. 140. Gas and vapor cycles, mixtures of gases and vapors, chemical reactions, introduction to fluid mechanics. 3 hr. rec.

144. *Thermodynamics of Fluids.* 3 hr. PR: M.E.M. 140. The dynamics and thermodynamics of fluids. Integral formulation of basic laws for closed and open systems and control volumes. Effects of heat conduction, viscosity, and compressibility on free and boundary flows. 3 hr. rec.

170. *Mechanical Engineering Analysis.* 3 hr. PR or Conc.: Math. 18. Numerical and graphical techniques applied to the solution of mechanical engineering problems. Analog and digital computer programming. Data analysis. 2 hr. rec., 3 hr. lab.

180. *Mechanical Engineering Measurements.* 3 hr. PR: M.E.M. 140. Static and dynamic measurements of pressure, temperature, force, stress, displacement, etc. Calibration of instruments and error analysis. 2 hr. rec., 3 hr. lab.

182. *Engineering Systems Laboratory.* 2 hr. PR: M.E.M. 180; PR or Conc.: M.E.M. 134, 144, 250. Experimental evaluation of modern and complex engineering systems. Participation in groups with oral and written presentation of results. 6 hr. lab.

200. *Advanced Mechanics of Materials I.* 3 hr. PR: M.E.M. 43 or consent. Theories of failure and design procedures; time and temperature dependent behavior; shear center, unsymmetrical bending, curved beams. 3 hr. rec.

204. *Dynamics of Physical Systems.* 3 hr. PR: M.E.M. 42 and Math. 18 or consent. Physical systems such as hydraulic, mechanical, electrical, electromechanical, electrohydraulic, hydromechanical, and thermodynamic considered. Emphasis on the modeling of compound systems and studying their natural behavior using analytical techniques. Use of computers in analysis of physical systems.

210. *Kinematics.* 3 hr. PR: M.E.M. 112 and Math. 18 or consent. Geometry of constrained motion, kinematics synthesis and design, special linkage. Coupler curves, inflection circle, Euler-Savary equation, cubic of stationary curvature and finite displacement techniques. 3 hr. rec.

222. *Mechanical Vibrations.* 3 hr. PR: Math. 18, M.E.M. 112, or consent. Fundamentals of vibration theory. Free and forced vibration of single and multiple degree of freedom systems. Solution by Fourier and Laplace transformation techniques. Transient analysis emphasized. Energy methods. 3 hr. rec.

232. *Introduction to Feedback Control.* 3 hr. PR: Math. 18, E.E. 105 or M.E.M. 204 or consent. Fundamentals of automatic control theory. Transfer functions and block diagrams for linear physical systems. Proportional, integral, and derivative controllers. Transient and frequency response analysis using Laplace transformation.

236. *Systems Analysis of Space Satellites.* 3 hr. PR: Senior standing. Introduction to engineering principles associated with analysis and design of space satellites. Emphasis on the interdisciplinary nature of satellite systems analysis. 3 hr. rec.

238. *Introduction to Underwater Engineering.* 3 hr. PR: Consent. Underwater portion of our world with emphasis on science and technology. Emphasis on economic and social needs for maritime resources, maritime law, and public policy, as well as general and basic engineering aspects of underwater communication, navigation, and structures.

240. *Problems in Thermodynamics.* 3 hr. PR: M.E.M. 141 or consent. Thermodynamic systems with special emphasis on actual processes. Problems presented are designed to strengthen the background of the student in the application of the fundamental thermodynamic concepts. 3 hr. rec.

242. *Bioengineering.* 3 hr. Introduction to human anatomy and physiology using an engineering systems approach. Gives engineering student basic understanding of the human system so that the student may include it as an integral part of the design.

244. *Introduction to Gas Dynamics.* 3 hr. PR: M.E.M. 144 or consent. Fundamentals of gas dynamics, one-dimensional gas dynamics and wave motion, measurement, effect of viscosity and conductivity, and concepts of gas kinetics. 3 hr. rec.

250. *Heat Transfer.* 3 hr. PR: M.E.M. 101 or 140. Steady state and transient conduction. Thermal radiation. Boundary layer equations and forced and free convection are also covered. 3 hr. rec.

254. *Applications in Heat Transfer.* 3 hr. PR: M.E.M. 250. For students desiring to apply basic heat transfer theory and digital computation techniques to problems involving heat exchangers, power plants, electronic cooling, manufacturing processes, and environmental problems.

262. *Internal Combustion Engines.* 3 hr. PR: M.E.M. 101 or 141. Thermodynamics of internal combustion engine; Otto cycle; Diesel cycle, gas turbine cycle, two- and four-cycle engines, fuels, carburetion, and fuel injection; combustion; engine performance, supercharging. 3 hr. rec. *(Course will not be offered in 1979-80.)*

264. *Heating, Ventilating, and Air Conditioning.* 3 hr. PR: M.E.M. 141 or consent. Methods and systems of heating, ventilating, and air conditioning of various types of building, types of controls and their application. 3 hr. rec.

282. *Engineering Acoustics.* 3 hr. PR: Math. 18 or consent. Theory of sound propagation and transmission. Important industrial noise sources and sound measurement equipment. Selection of appropriate noise criteria and control methods. Noise abatement technology. Laboratory studies and case histories.

290. *Seminar.* 1-6 hr. PR: Junior, senior, or graduate status, and consent.

294. *Special Topics.* 1-6 hr. PR: Junior, senior, or graduate status, and consent.

299. *Special Problems.* 1-6 hr. PR: Junior, senior, or graduate status.

301. *Advanced Engineering Acoustics.* 3 hr. PR: M.E.M. 282 or consent. Study of complex sound generation and the propagation, transmission, reflection, and absorption of air-borne and structure-borne sound. Coupling of sound and vibration in structures. Acoustical behavior and characteristics of materials.

305. *Analytical Methods in Engineering I.* 3 hr. PR: Consent. Index notation for determinants, matrices, and quadratic forms; linear vector spaces, linear operators including differential operators; calculus of variations, eigenvalue problems, and boundary value problems.

306. *Analytical Methods in Engineering II.* 3 hr. PR: M.E.M. 305 or at least two semesters of advanced calculus. Intended for advanced graduate students interested in modern analysis for engineering applications.

307. *Non-Linear Analysis in Engineering.* 3 hr. PR: Consent. Special topics in non-linear analysis of various types of engineering systems. Various numerical, approximate, and analytical techniques chosen to suit the needs and interests of advanced graduate students.

310. *Advanced Mechanics of Materials II.* 3 hr. PR: Consent. Beams on elastic support, cylindrical shells with bending, torsion of noncircular members, two-dimensional applications in elasticity, contact stresses, and simple problems in plates and shells. 3 hr. rec.

312. *Inelastic Behavior of Engineering Materials.* 3 hr. PR: M.E.M. 41, 42, 43 and consent. Characterization and modeling of typical engineering materials, elastic, viscoelastic, and plastic materials, design considerations.

316. *Energy Methods in Applied Mechanics.* 3 hr. PR: Consent. Variational principles of mechanics and applications to problems; principles of virtual displacements, minimum potential energy, and complementary energy. Castigliano's theorem, Hamilton's principle. Applications to theory of plates, shells, and stability. 3 hr. rec.

318. *Continuum Mechanics.* 3 hr. PR: M.E.M. 41, 42, 43. Basic laws of physical behavior of continuous media. Analysis of stress; equations of motion and boundary conditions; kinematic analysis; rates of strain, dilatation and rotation; bulk time, rates of change; constitutive equations with special attention to elastic bodies and ideal fluids; energy equations and the first law of thermodynamics. 3 hr. rec.

320. *Theory of Elasticity I.* 3 hr. Cartesian tensors; equations of classical elasticity, energy, minimum, and uniqueness theorems for the first and second boundary value problems; St. Venant principle; extension, torsion, and bending problems. 3 hr. rec.

322. *Advanced Vibrations I.* 3 hr. PR: M.E.M. 222 or consent. Dynamic analysis of multiple degree of freedom discrete vibrating systems. Lagrangian formulation matrix and numerical methods, impact and mechanical transients.

325. *Experimental Stress Analysis.* 3 hr. PR: M.E.M. 41, 42, 43. Classical photoelasticity, brittle lacquers, birefrigent coatings, strain gage techniques and instrumentation, as applied to problems involving static stress distributions. 2 hr. rec., 3 hr. lab.

330. *Instrumentation in Engineering I.* 3 hr. PR: Consent. Theory of measuring systems, emphasizing measurement of rapidly changing force, pressure, strain, temperature, vibration, etc. Available instruments, methods of noise elimination, types of recording studied. Special value to students in experimental research. 2 hr. rec., 3 hr. lab.

333. *Advanced Machine Design.* 3 hr. PR: M.E.M. 134 or consent. Design for extreme environments, material selection, lubrication and wear, dynamic loads on cams, gears, and bearings, balancing of multi-engines and rotors, electromechanical components.

340. *Advanced Thermodynamics I.* 3 hr. PR: M.E.M. 141. First and second laws of thermodynamics with emphasis on the concept of entropy production. Application to a variety of nonsteady open systems, thermodynamics of multiphase, multicomponent and reacting systems. Criteria for equilibrium and stability.

342. *Advanced Thermodynamics II.* 3 hr. PR: M.E.M. 340 or consent. Continuation of topics related to reactive systems. Adiabatic flame temperatures, reaction kinetics, conservation of species equations, flame propagation and detonation.

344. *Statistical Thermodynamics.* 3 hr. PR: M.E.M. 340 or equiv. Microscopic thermodynamics for Boltzmann, Bose-Einstein, and Fermi-Dirac statistics. Schrodinger wave equation, partition functions for gases and solids. *(Course will not be offered in 1979-80.)*

348. *Heat Transfer.* 3 hr. PR: Undergraduate course in heat transfer or consent. Graduate course in heat transfer primarily for mechanical engineering students. Topics include one-, two-, and three-dimensional thermal conduction involved in mechanical processes both for constant and time varying temperature fields, free and forced convection in heat exchangers, heat power equipment and aircraft and radiative heat transfer between surfaces and absorbing media as found in furnaces, industrial processes, and aerospace applications.

350. *Conduction Heat Transfer.* 3 hr. PR: M.E.M. 250 or consent. Analytical, numerical, graphical, and analog solutions of steady and non-steady heat conduction problems in isotropic and anistropic solids. Thermal properties, extended surfaces, thermal stress, interphase conduction with moving interface, localized and distributed sources.

352. *Intermediate Dynamics.* 3 hr. PR: M.E.M. 42. Newtonian and Lagrangian mechanics. Dynamics of discrete systems and rigid bodies analyzed utilizing Newtonian and Lagrangian formulations.

353. *Advanced Dynamics I.* 3 hr. PR: M.E.M. 352 or consent. Analytical mechanics. Stability of autonomous and non-autonomous systems considered and analytical solutions by perturbation techniques introduced. Hamilton-Jacobi equations developed. Problems involving spacecraft, gyroscopes and celestial mechanics studied.

354. *Convection Heat Transfer.* 3 hr. PR: M.E.M. 250 or consent. Laminar and turbulent flows. Analytical, numerical, and analogical solution. Selected topics study of current research publications.

355. *Radiation Heat Transfer.* 3 hr. PR: M.E.M. 250 or consent. Classical derivation of black body radiation laws; grey body and non-grey body analysis; radiant properties of materials, radiant transport analysis; specular-diffuse networks, gas radiation, thermal radiation measurements; analytical, numerical solutions, and study of selected current publications.

360. *Fluid Mechanics I.* 3 hr. PR: M.E.M. 144 or equiv. Advanced dynamics and thermodynamics of fluids. Basic laws of conservation of mass and momentum in differential, vector, and integral forms. Application to internal flows, fluid machinery, and structures.

364. *Turbomachinery.* 3 hr. PR: M.E.M. 101 or 141. Flow problems encountered in design of water, gas, and steam turbines, centrifugal and axial flow pumps and compressors, design parameters.

384. *Feedback Control in Mechanical Engineering.* 3 hr. PR: M.E.M. 232 or consent. Control analysis of hydraulic and pneumatic closed-loop systems including spool valves, flapper valves, pumps, servomotors, and electrohydraulic servomechanisms. Investigation of nonlinearities by phase plane, Liapunov, and describing function techniques. Programming for analog and digital computer simulation. Introduction to fluidic elements and logic circuits.

394. *Special Topics.* 1-6 hr. For senior and graduate students.

399. *Special Problems.* 1-6 hr. For senior and graduate students.

College of Human Resources and Education

If your enjoy working with people to help them realize their potential, the College of Human Resources and Education will prepare you for a career in such fields as counseling, dietetics, home economics, speech pathology and audiology, special education, health education, and teaching.

At the undergraduate level the College of Human Resources and Education is organized into the departmental program and service areas of Curriculum and Instruction, Special Education, Speech Pathology and Audiology, Educational Psychology, Health Education, Reading, and Family Resources. Degrees in every teaching field — from early childhood education to secondary school specializations — are offered through the Department of Curriculum and Instruction. The most modern instructional facilities strengthen the specialized programs provided in Speech Pathology and Audiology. Students in Family Resources may study in such fields as textiles and clothing, nutrition and foods, housing and design, home economics, and child development.

All programs lead to the baccalaureate degree, preparation for graduate work, certification and licensure in teaching, or other specialization related careers. A strong liberal arts background is necessary for students to benefit fully from the College's programs. So students spend part of their first two academic years taking such liberal arts courses as literature, economics, history, mathematics, and courses in the natural and physical sciences. Students preparing for teaching careers also are exposed to classroom teaching.

Admission

Requirements for admission to the undergraduate programs of the College of Human Resources and Education are listed by program areas in subsequent pages of this *Catalog*.

Candidates for bachelor's degrees in Family Resources and in Speech Pathology and Audiology may enter these programs during their freshman years.

Students who enter the program area of Education must have completed a minimum of 58 semester hours with a grade-point average of at least 2.25 on all work attempted. These candidates register for their first two years of work in the College of Arts and Sciences. Freshmen and sophomores who expect to enter the program area of Curriculum and Instruction, will indicate their intention when they register. Their studies will be directed by advisers for pre-education students. Such students should arrange their courses of study so as to satisfy requirements for junior standing and should be fulfilling requirements for certification of teachers.

Complete information concerning WVU admissions, registration, fees and expenses, and regulations may be obtained in Part 2 of the *Undergraduate Catalog*.

Faculty

William G. Monahan, Ed.D. (Mich. St. U.), *Dean of College of Human Resources and Education and Professor.*
John L. Carline, Ph.D. (Syracuse U.), *Associate Dean and Professor.*

Ernest R. Goeres, Ph.D. (U. Iowa), *Assistant Dean and Associate Professor.*
Laddie R. Bell, Ed.D. (U. Va.), *Assistant Dean for Off-Campus Education and Professor.*

Department of Counseling and Guidance and Rehabilitation Counseling

Jeffrey K. Messing, Ed.D. (Syracuse U.), *Professor and Chairman.*
Thomas Blaskovics, Ph.D. (U. Wisc.), *Associate Professor.*
Sherilyn Cormier, Ph.D. (Purdue U.), *Associate Professor.*
William Cormier, Ed.D. (U. Tenn.), *Professor.*
Susan Corrigan, M.A. (Boston U.), *Assistant Professor.*
James DeLo, Ph.D. (U. Pitt.), *Professor.*
Kathryn B. Greever, Ed.D. (WVU), *Associate Professor.*
Edward E. Jacobs, Ph.D. (Fla. St. U.), *Associate Professor.*
Ranjit K. Majumder, Ph.D. (U. Okla.), *Professor; Director of Research, Research and Training Center.*
Robert P. Marinelli, Ed.D. (Penn. St. U.), *Associate Professor.*
Robert L. Masson, Ed.D. (SUNY), *Associate Professor.*
Elizabeth Minton, M.S.W. (Ohio St. U.), *Associate Professor.*
Joseph Moriarty, Ph.D. (Fordham U.), *Professor.*
Michael A. Oliverio, M.A. (WVU), *Adjunct Instructor.*
John Panza, M.A. (WVU), *Adjunct Instructor.*
David Srebalus, Ed.D. (Ind. U.), *Associate Professor.*
Roy Tunick, Ed.D. (U. No. Colo.), *Associate Professor.*
Michael Yura, Ph.D. (Ohio St. U.), *Associate Professor.*

Department of Curriculum and Instruction

Paul R. McGhee, Ph.D. (Syracuse U.), *Associate Professor and Chairman.*
Patrick E. Balch, A.B. (Chico St. C.), *Associate Professor.*
Barbara A. Barnes, *Teacher Certification Analyst.*
Barbara T. Bontempo, Ed.D. (Ind. U.), *Assistant Professor.*
W. Scott Bower, Ph.D. (WVU), *Associate Professor.*
John L. Carline, Ph.D. (Syracuse U.), *Professor and Associate Dean.*
Michael A. Caruso, M.A. (WVU), *Assistant Professor, Teacher Certification Analyst.*
Urban Couch, M.F.A. (Cranbrook Acad. Art), *Adjunct Professor.*
Gloria S. Cunningham, M.S. (WVU), *Assistant Professor.*
Ardeth M. Deay, Ph.D. (Cornell U.), *Assistant Professor.*
Sandra B. DeCosta, M.A. (WVU), *Assistant Professor.*
J. William Douglas, Ph.D. (Ohio St. U.), *Adjunct Associate Professor.*
Christopher Eisele, Ph.D. (Ohio St. U.), *Assistant Professor.*
David A. England, Ph.D. (Ind. U.), *Associate Professor.*
Lawrence G. Erickson, Ph.D. (U. Wisc.), *Professor.*
Marilyn M. Fairbanks, Ph.D. (WVU), *Associate Professor.*
Thomas C. Hatcher, Ph.D. (Ohio St. U.), *Professor.*
John P. Helfeldt, Ph.D. (Syracuse U.), *Assistant Professor.*
Betsy Hobbs, Ed.D. (WVU), *Assistant Professor.*
Boyd D. Holtan, Ed.D. (U. Ill.), *Professor.*
Ronald V. Iannone, Ed.D. (Syracuse U.), *Professor.*
Warren G. Kelly, Ed.D. (U. Mo.), *Adjunct Professor.*
Robert L. Kurucz, Ph.D. (Ohio St. U.), *Adjunct Professor.*
Layle D. Lawrence, Ph.D. (LSU), *Associate Professor.*
Margaret Lopez, M.A. (WVU), *Teacher Certification Analyst.*
O. Claude McGhee, Ph.D. (Ohio St. U.), *Professor.*
C. Everett Marcum, H.S.D. (Ind. U.), *Adjunct Professor.*
Hazel E. Marsicano, Ed.D. (SUNY—Buffalo), *Assistant Professor.*
Roy A. Moxley, Ph.D. (U. Mich.), *Associate Professor.*
Kenneth Murray, Ph.D. (Ohio St. U.), *Professor.*

Patricia Obenauf, Ed.D. (U. Va.), *Associate Professor.*
Franklin Parker, Ed.D. (Geo. Peabody C.), *Claude Worthington Benedum Professor.*
Perry Phillips, Ed.D. (WVU), *Associate Professor.*
Ronald L. Redick, Ph.D. (Ohio St. U.), *Associate Professor.*
Jerilyn K. Ribovich, Ph.D. (U. Md.), *Assistant Professor.*
Martin Saltz, Ph.D. (U. Conn.), *Associate Professor.*
Charles M. Smith, M.S. (WVU), *Instructor.*
Patricia K. Smith, Ed.D. (WVU), *Assistant Professor.*
Arthur R. Solomon, Ph.D. (U. Ill.), *Assistant Professor.*
Floyd Stead, Ed.D. (WVU), *Assistant Professor; Coordinator of Educational Research and Field Services.*
Cynthia C. Sunal, Ph.D. (U. Md.), *Assistant Professor.*
Dennis W. Sunal, Ph.D. (U. Mich.), *Assistant Professor.*
Wallace C. Venable, Ed.D. (WVU), *Adjunct Assistant Professor.*
Charles Wales, Ph.D., (Purdue U.), *Adjunct Professor.*
Charles D. Wilhelm, Ed.D. (U. Fla.), *Assistant Professor.*
Mary I. Yeazell, Ed.D. (U. Ill.), *Professor.*
C. Peter Yost, Ph.D. (U. Pitt.), *Adjunct Professor.*

Department of Education Administration

James A. Martin, Ed.D. (U. Tenn.), *Professor and Chairman.*
John O. Andes, Ed.D. (U. Fla.), *Professor.*
Robert Baldwin, Ph.D. (Cornell U.), *Professor Emeritus.*
Laddie R. Bell, Ed.D. (U. Va.), *Professor; Assistant Dean — Off-Campus Education.*
John Brisbane, Ed.D. (WVU), *Assistant Professor; Dean, Admissions and Records.*
Gene A. Budig, Ed.D. (U. Nebr.), *Professor; President of WVU.*
Frank Carney, Ed.D. (WVU), *Adjunct Assistant Professor.*
Wilson I. Gautier, Ed.D. (WVU),*Professor.*
Ernest R. Goeres, Ph.D. (U. Iowa), *Associate Professor; Assistant Dean.*
Harold I. Goodwin, Ph.D. (U. Cal.), *Professor.*
Harry Heflin, Ph.D. (U. Pitt.), *Professor Emeritus.*
Arthur N. Hofstetter, Ed.D. (U. Va.), *Professor Emeritus.*
H. Edward Lilley, Ph.D. (Tex. A&M U.), *Assistant Professor.*
Richard F. Meckley, Ph.D. (Ohio St. U.), *Professor.*
Delmas Miller, Ph.D. (U. Pitt.), *Professor Emeritus.*
William G. Monahan, Ed.D. (Mich. St. U.), *Professor; Dean.*
John R. Pisapia, Ed.D. (WVU), *Associate Professor.*
Edwin R. Smith, Ed.D. (WVU), *Associate Professor.*

Department of Educational Psychology

Benjamin H. Bailey, Ed.D. (U. Fla.), *Professor and Chairman.*
James S. Atkins, M.A. (WVU), *Instructor.*
Sheldon R. Baker, Ed.D. (Case West. Res. U.), *Associate Professor.*
Lawrence E. Fraley, Ed.D. (U. So. Cal.), *Associate Professor.*
John Grasso, Ph.D. (Ohio St. U.), *Assistant Professor.*
Richard Hartnett, Ed.D. (WVU), *Assistant Professor.*
Richard Howard, Ph.D. (VPI), *Assistant Professor.*
Daniel E. Hursh, Ph.D. (U. Kans.), *Assistant Professor.*
Rogers McAvoy, Ph.D. (Ind. U.), *Professor.*
Pamela M. Meadowcroft, Ph.D. (U. Pitt.), *Assistant Professor.*
Anne H. Nardi, Ph.D. (WVU), *Associate Professor.*
John J. Paterson, Ed.D. (Mich. St. U.), *Professor.*
Floyd L. Stead, Ed.D. (WVU), *Assistant Professor; Coordinator of Educational Research and Field Services.*
Meng-shu Tseng, Ed.D. (Ind. U.), *Professor.*
Ernest A. Vargas, Ph.D. (U. Pitt.), *Associate Professor.*

Julie S. Vargas, Ph.D. (U. Pitt.), *Professor.*
Richard T. Walls, Ph.D. (Penn. St. U.), *Professor.*

Department of Educational Research and Field Services

Floyd Stead, Ed.D. (WVU), *Assistant Professor; Coordinator.*
Richard Hartnett, Ed.D. (WVU), *Assistant Professor.*
John J. Paterson, Ed.D. (Mich. St. U.), *Professor.*
Mark D. Souther, Ed.D. (WVU), *Assistant Professor.*
Steve Scherer, M.S. (Ball St. U.), *Extension Specialist.*

Department of Family Resources

John A. Shultz, Ph.D. (Ohio St. U.), *Professor and Chairman.*
Margaret P. Abbott, M.P.H. (U. N.D.), *Associate Professor.*
Margaret Albrink, M.D. (Yale U.), *Adjunct Professor.*
Gladys R. Ayersman, M.S. (WVU), *Assistant Professor Emerita.*
Sara Ann Brown, Ph.D. (Iowa St. U.), *Professor Emerita.*
Dianne Cooper Buckner, M.S. (Tuskegee Inst.), *Assistant Professor.*
M. Kate Clark, Ed.D. (WVU), *Adjunct Assistant Professor.*
Brenda S. Craig, M.S. (Purdue U.), *Assistant Professor.*
Wylene P. Dial, M.A. (Marshall U.), *Adjunct Assistant Professor.*
Shirley Eagan, M.Ed. (N.C. St. U.), *Adjunct Assistant Professor.*
S. Jane Goodman, Ph.D. (Penn. St. U.), *Associate Professor.*
Babette Graf, M.S. (Penn. St. U.), *Associate Professor.*
Audrey G. Guthrie, M.S. (Cornell U.), *Associate Professor.*
Joann L. Guthrie, M.S. (WVU), *Assistant Professor*
William H. Hagerty, M.A. (WVU), *Assistant Professor.*
Mary Rose Jones, M.S. (WVU), *Associate Professor Emerita.*
Marian B. Liddell, M.S. (E. Car. U.), *Instructor.*
Nora M. MacDonald, M.S. (Iowa St. U.), *Assistant Professor.*
Donna Maughan, M.S. (WVU), *Instructor.*
Johann R. Mitchell, M.S. (U. Md.), *Instructor.*
Reva Belle Neely, M.E. (Colo. St. U.), *Associate Professor Emerita.*
M. Zafar Nomani, Ph.D. (Rutgers U.), *Assistant Professor.*
Rebecca Poston, M.S. (U. Okla.), *Adjunct Instructor.*
Betty Lou Ramsey, M.S. (U. Tenn.), *Associate Professor.*
Dottie Rauch, M.Ed. (Penn. St. U.), *Assistant Professor.*
Sharon V. Redick, Ph.D. (Iowa St. U.), *Associate Professor.*
Alan R. Sack, Ph.D. (VPI), *Assistant Professor.*
Dorothy Schusterman, M.S. (Case West. Res. U.), *Adjunct Assistant Professor.*
Dorothy M. Shull, M.S. (Fla. St. U.), *Assistant Professor.*
Mark D. Souther, M.S. (WVU), *Instructor.*
Cynthia Sunal, Ed.D. (U. Md.), *Assistant Professor.*
Carl B. Taylor, Ph.D. (Penn. St. U.), *Professor Emeritus.*
Ngaire M. van Eck, M.A.H.E. (Mich. St. U.), *Adjunct Assistant Professor.*
Tanya R. Von Gustedt, M.S.W. (Stuttgart Sch. S.W.), *Adjunct Assistant Professor.*
Mary Ware, M.S. (U. Nebr.), *Adjunct Instructor.*
Ruth E. Weibel, M.S. (U. Tenn.), *Associate Professor.*
Jeraldine L. Withycombe, Ph.D. (U. Conn.), *Assistant Professor.*
Janice I. Yeager, M.S. (U. Ill.), *Associate Professor.*

Department of Health Education

Bill Carlton, Ed.D. (U. Tenn.), *Associate Professor and Chairman.*
Samuel B. Folio, M.A. (WVU), *Instructor.*

Department of Research and Training

Ranjit K. Majumder, Ph.D. (U. Okla.), *Professor; Director of Research, Research & Training Center.*
Joseph B. Moriarty, Ph.D. (Fordham U.), *Associate Professor; Director of Research and Training Center.*
Richard T. Walls, Ph.D. (Penn. St. U.), *Research Associate.*
Meng-shu Tseng, Ed.D. (Ind. U.), *Research Associate.*
Michael D. Wesolowski, Ph.D. (So. Ill. U.), *Assistant Professor.*
Don E. McLaughlin, M.A. (WVU), *Research Instructor.*
Antonio E. Jones, M.A. (WVU), *Research Instructor.*
Richard Nida, Ph.D. (Ohio U.), *Training Associate.*
Hampapur N. Seethamma, M.A. (WVU), *Research Instructor.*
Elizabeth B. Minton, M.S.W. (Ohio St. U.), *Associate Professor; Director of Training, Research and Training Center.*

University Affiliated Center (UAC)

Kathryn B. Greever, Ed.D. (WVU), *Associate Professor; Director of UAC.*
George Bennett, M.S.W. (U. Pitt.), *Adjunct Assistant Professor.*
Michael R. Brown, B.S. (U. No. Colo.), *Research Instructor.*
John D. Cone, Ph.D. (U. Wash.), *Associate Professor.*
Karen A. Connors, Ph.D. (Temple U.), *Assistant Professor.*
Gordon R. Kent, M.S. (WVU), *Assistant Professor.*
Dianne T. Woodrum, Ed.D. (WVU), *Assistant Professor.*
Ann Sauvageot, M.A. (WVU), *Research Instructor.*
Cheryl L. Prichard, M.A. (WVU), *Instructor.*

Department of Special Education

Wilfred D. Wienke, Ed.D. (U. No. Colo.), *Professor and Chairman.*
J. Eugene Clements, Ed.D. (U. Kans.), *Associate Professor.*
Barbara Jones, M.A. (Marshall U.), *Visiting Instructor.*
Louise Kaczmarek, Ph.D. (U. Rochester), *Assistant Professor.*
Thomas P. Lombardi, Ed.D. (U. Ariz.), *Professor.*
Gabriel A. Nardi, Ph.D. (U. Wisc.), *Professor.*
Robert H. Neff, Ed.D. (WVU), *Professor Emeritus.*
Fred Orelove, M.A. (U. Ill.), *Instructor.*
John S. Platt, Ed.D. (U. Kans.), *Assistant Professor.*
Annette U. Shuck, Ed.D. (WVU), *Assistant Professor.*

Department of Speech Pathology and Audiology

Norman J. Lass, Ph.D. (Purdue U.), *Professor, Chairman.*
Peter K. Americo, M.S. (WVU), *Adjunct Instructor.*
Frank D. Andrews, M.S. (U. Wisc.), *Adjunct Instructor.*
Peter N. Arkis, M.A. (Kent St. U.), *Adjunct Instructor.*
Carolyn P. Atkins, Ed.D. (WVU), *Assistant Professor.*
Mary Jo Bailey, M.A. (Ohio St. U.), *Adjunct Instructor.*
Wanda I. Black, M.S. (WVU), *Adjunct Instructor.*
Larry A. Bell, M.S. (WVU), *Adjunct Instructor.*
Wayne G. Bodenhemier, Ph.D. (U. Pitt.), *Assistant Professor.*
Deborah B. Boyd, M.S. (U. N.C.), *Adjunct Instructor.*
Krista N. Browning, M.S. (WVU), *Adjunct Instructor.*
John F. Carter, Ph.D. (U. Md.), *Adjunct Associate Professor.*
Lynn R. Cartwright, M.S. (WVU), *Instructor.*
Laurie Caufield, M.Ed. (U. Va.), *Adjunct Instructor.*
Robert C. Cody, M.A. (U. Iowa), *Adjunct Associate Professor.*
Donald P. Coen, M.A. (Kent St. U.), *Adjunct Instructor.*

Leonard M. Davis, Ph.D. (Northwestern U.), *Professor.*
Helen K. Ezell, M.A. (Ohio U.), *Adjunct Instructor.*
Kathy M. Finsley, M.S. (WVU), *Adjunct Instructor.*
Phyllis L. Flowers, M.A. (Mich. St. U.), *Adjunct Assistant Professor.*
Paul T. Fogle, Ph.D. (U. Iowa), *Assistant Professor.*
James H. Frail, M.S. (WVU), *Adjunct Instructor.*
Brad W. Friedrich, Ph.D. (Northwestern U.), *Adjunct Assistant Professor.*
Pamela George, M.Ed. (Smith C.), *Instructor.*
Francine Helfner, M.A. (U. Ill.), *Adjunct Instructor.*
Melanie A. Hemmann, M.S. (WVU), *Adjunct Instructor.*
Marian Jarrett, M.A. (Northwestern U.), *Adjunct Instructor.*
Robin R. Jones, M.S. (WVU), *Instructor.*
Judy Rae Kelley, M.S. (WVU), *Instructor.*
Nancy M. Laughlin, M.S. (Memphis St. U.), *Adjunct Instructor.*
Pamela Luft, M.Ed. (U. W. Md.), *Adjunct Instructor.*
Vincent Lustig, Ph.D. (Ohio St. U.), *Adjunct Associate Professor.*
Barbara I. Moidel, M.A. (W. Mich. U.), *Adjunct Instructor.*
John R. Owen, M.A. (Marshall U.), *Adjunct Instructor.*
Nancy M. Panzera, M.S. (WVU), *Adjunct Instructor.*
Sara D. Peaks, M.S. (WVU), *Adjunct Instructor.*
Cheryl L. Prichard, M.S. (WVU), *Instructor.*
Dennis M. Ruscello, Ph.D. (U. Ariz.), *Assistant Professor.*
Alan I. Segal, M.S. (U. Pitt.), *Adjunct Instructor.*
Stephen D. Shevitz, M.A. (U. Md.), *Adjunct Instructor.*
Shirley J. Starkey, M.A. (U. Iowa), *Adjunct Instructor.*
Rachel E. Stark-Seitz, Ph.D. (U. Okla.), *Adjunct Associate Professor.*
Kenneth O. St. Louis, Ph.D. (U. Minn.), *Assistant Professor.*
Diane C. Taylor, M.S. (WVU), *Adjunct Instructor.*
Mary Ellen Tekieli, Ph.D. (U. Okla.), *Assistant Professor.*
Nancy A. Thorson, M.A. (Ohio U.), *Adjunct Instructor.*
Janis Van Eman, M.A. (U. Ark.), *Lecturer.*
Denise M. Yezierski, M.S. (U. N.C.), *Adjunct Instructor.*

Department of Technology Education

Paul DeVore, Ed.D. (Penn. St. U.), *Professor and Chairman.*
Thomas J. Brennan, Ed.D. (Bradley U.), *Professor Emeritus.*
David L. DePue, Ph.D. (Ohio St. U.), *Associate Professor.*
David L. McCrory, Ph.D. (Case West. Res. U.), *Associate Professor.*
Edward C. Pytlik, Ph.D. (Iowa St. U.), *Assistant Professor.*

Curriculum and Instruction

The program area of Curriculum and Instruction prepares students for the teaching professions. Many advances have been made in developing good learning conditions for children and youth. The teacher and other education professionals are designing and operating educational systems to provide these optimum learning opportunities. The prospective teacher is influenced as much by the way the classes are taught as by *what* is taught. The program at WVU emphasizes individual learning, flexible schedules, student decision making, small group interaction, and the teacher as a human being.

In the self-instruction laboratory, students work as individuals, or in small groups of their own choosing. When they feel they have mastered the particular concepts or techniques, they ask to be tested. If found proficient, they go on to other tasks; if not, they continue work in the laboratory, at their own pace and at their own convenience.

Simulation techniques are employed using specially developed films. The student assumes the role of the teacher observing classroom conditions which may prevail and makes decisions at certain critical points. The student then sees the consequences of a decision as portrayed by an actual classroom under similar conditions. The student, classmates, and professor then discuss the situation and the results.

Micro-teaching is utilized to enable the student to teach small groups of peers and children for short periods of time. The teaching is recorded by audio or videotape so that the student may view the teaching and analyze alone or with others. Students also have direct experiences with youngsters working as teacher-aids, tutors, community center workers, and student teachers.

West Virginia University is accredited by the National Council for Accreditation of Teacher Education for the preparation of elementary teachers, secondary teachers, school service personnel, and school administrators, with the Doctor of Education as the highest degree approved.

West Virginia Board of Education Regulation for Teacher Certification

The West Virginia Board of Education requires that 100 of the 128 semester hours required for certification shall be completed in regularly scheduled campus courses. The 28 hours of permissible nonresidence courses may be earned by off-campus study, home study (correspondence), radio, television, special examination, and/or military service.

Renewal of Professional Certificates

All courses for renewal of professional certificates are selected in terms of the teacher's objectives for the improvement of instruction and must be recommended by the county superintendent on a form. The student should have this completed form when registering.

Graduation Requirements

To be eligible for recommendations for the degrees of Bachelor of Science in Secondary Education or Bachelor of Science in Elementary Education, a candidate must:

1. Comply with the general regulations of the University concerning entrance, advanced standing, classification, examination, marks, grade points, etc.
2. Satisfy the following requirements:
   a. Complete the required courses and the minimum number of hours of approved elective courses in education, if any.
   b. Select and pursue subject specialization(s) for the B.S. in Secondary Education or the B.S. in Elementary Education.
   c. Adhere to the patterns prescribed in completing the subject specialization(s).
   d. Present a minimum of 128 hours of approved college credit, if in Secondary Education, or in Elementary Education. A general average of C as described under "General Requirements for Certification" must be attained for the total hours. (Math. 2 will not be counted toward meeting the total hours for graduation.) Forty-five of these hours must be upper-division courses.

e. Complete 26 hours after enrolling in the program area of Curriculum and Instruction.
f. Be at least 18 years of age, of good moral character, interested in education work, and mentally, physically, and otherwise qualified to perform the duties of a teacher.

Fulfillment of the requirements for graduation from the program area of Curriculum and Instruction, College of Human Resources and Education, qualifies a candidate to apply for recommendation for a West Virginia professional certificate.

The College may require appropriate standardized tests of its graduates.

Reciprocal Certification Agreements

West Virginia, at the time of publication, has reciprocal agreements on teacher certification with twenty-three other states. Any inquiries relevant to reciprocity in certification can be made with Michael A. Caruso, Student Advising and Records, 508 Allen Hall.

General Requirements for Professional Certificates

West Virginia University standards for admission to the teacher education program should not be confused with the minimum state standards for certification. Admissions standards for elementary and secondary education are set forth on pages herein.

To teach in the public schools of West Virginia, one must hold a certificate issued by the West Virginia Department of Education. Before any WVU applicant is eligible to receive a professional certificate the applicant must have: (1) met the minimum state requirements; (2) met the University degree requirements; (3) been recommended by the Dean of the College of Human Resources and Education as herein prescribed; and (4) taken the National Teachers Examination: (a) Secondary majors take the Commons examination and the Area examination of their first teaching specialization; (b) Elementary majors take the Commons examination and Section 01 — Education in the Elementary School; (c) Early Childhood majors take the Commons examination and Section 02 — Early Childhood Education.

The College of Human Resources and Education will inform each of its students who is a prospective teacher, and any other prospective teacher, upon request, of the requirements for certification, and will assist in preparing a program of study to meet these requirements. It is the obligation of the student who desires such counsel to arrange a conference some time before the end of the sophomore year.

A candidate for certification is required to achieve a grade-point average of 2.0 (C) or better as follows: (1) on the total of college credits earned; (2) on the hours earned in education; (3) in student teaching; and (4) in each subject specialization.

The West Virginia Department of Education uses a system of calculating grade-point averages for certification purposes which differs in some respects from WVU's system. All course work attempted at WVU and at other institutions of collegiate grade will be considered. If a student earns a grade of D, F, or U on any course taken no later than the semester or summer when the student has attempted a total of 60 hours, and if the student repeats this course, the first grade shall be disregarded for the purpose of determining the student's grade-point average and the second grade earned shall be used.

The Department of Curriculum and Instruction employs the West Virginia Department of Education's system of calculating grade-point averages only for purposes of admission to the Department of Curriculum and Instruction, for admission to student teaching, and for assessing teaching field and education averages. Academic performance and eligibility for graduation will be assessed by the system employed at WVU which is to count only work taken at WVU each time attempted.

The Dean of the College recommends candidates for professional certificates only after the completion of work for the baccalaureate degree. To be eligible for recommendation by the University for any professional certificate, the applicant must have done student teaching under the supervision of the College of Human Resources and Education. The applicant must apply for the certificate.

At least 45 hours of upper-division work, WVU standards, are required for all teaching certificates. The qualifications herein prescribed are minimum, not optimum or maximum, and must be met by all candidates.

PROGRAM FOR ELEMENTARY AND EARLY CHILDHOOD SCHOOL TEACHERS

Requirements for Degree of Bachelor of Science in Elementary Education and for Recommendation for Professional Certificate, Grades 1-6, N-6, and 4-8

Lower-Division Work

In preparing for admission to the Department of Curriculum and Instruction and the work of preparing for teaching at early childhood and elementary levels, students will register in their freshman and sophomore years in the pre-education program of the College of Arts and Sciences and pursue the program of general education that the State Board of Education has prescribed for all students who seek recommendation for teaching certificates. This program of prescribed work is included in the "Program for Elementary and Early Childhood Education Teachers."

Upper-Division Work

For admission to the prescribed courses in Elementary Education, students must register the final two years in the Department of Curriculum and Instruction. The following will be required:

1. Must have completed 58 hours of approved college work.
2. A grade-point average of 2.25 on all work attempted for enrollment in the student teaching block.

In lower-division work students should pursue the required lower-division courses, so that the greatest possible number of hours taken during the junior and senior years may be courses having upper-division credit.

To become eligible for recommendation for the degree of Bachelor of Science in Education and for the Professional Certificate, Grades 1-6, the student must complete the required curriculum and plan of work with a grade-point average of 2.0 (C) or better, as follows: (1) on the total of college credits earned; (2) on the hours earned in education; (3) in the subject specialization; and (4) in student teaching; and the student has been enrolled in the Department of Curriculum and Instruction for at least 30 hours of work, including a minimum of 12 hours in student teaching.

PROGRAMS FOR UNDERGRADUATE ELEMENTARY AND EARLY CHILDHOOD EDUCATION, GRADES 1-6, N-6, AND 4-8

GENERAL ACADEMIC CONCENTRATION
(128 semester hours required)

	Required Sem. Hr.
GENERAL ACADEMIC REQUIREMENTS (1-6, N-6, 4-8)	90
HEALTH AND PHYSICAL EDUCATION	6
Hl. Ed. 101 — School Health Education	2
P.E. 41	1
P.E. 42	1
P.E. 43	2
HUMANITIES	19
Art and Music	7
Art 3 — Materials and Procedure*	3
Music 41 — Music As an Art and Science*	2
Music 42 — Music Materials and Procedures*	2
Language Arts	12
Engl. 1 and 2 — Composition and Rhetoric*	6
Engl. 35 or 36	3
L. Sci. 203 — Literature for Children	3

*Meets core and general studies requirements.

SCIENCE AND MATHEMATICS	21
P. Sci. 1 and 2 — Introductory General Course*	8
Biol. 1 or 2 — General Biology	4
Math. 33, 34 — Introductory Mathematics for Teachers (N-8)*	6
Math. 131 — Informal Geometry and Algebra for Teachers (N-8)	3

*Meets core and general studies requirements.

SOCIAL STUDIES	18
S. Sci. 1 or 2 — Introductory General Course	3
Hist. 1 or 2 — Western Civilization* *and*	
Hist. 52 or 53 — American History*	6-9
S. Sci. 1 or 2 — Introductory General Course *or*	
Soc.&A. 1 — Introduction to Sociology, *or*	
Soc.&A. 5 — Introduction to Anthropology, *or*	
Soc.&A. 7 — Introduction to Social Problems, *or*	
Econ. 51 — The Economic System, *or*	
Pol. S. 2 — The American Federal System, *or*	
Geog. 7 — Physical Geography, *or*	
Geog. 8 — Human Geography, *or*	
Geog. 140 — Geography of United States and Canada	
Psych. 1 — Introduction to Psychology	6-9

*3 hr. must be in Western Civilization and 3 hr. in American History.

SPECIALIZATION SUGGESTED*	15-24

Available, with additional certification, as indicated: Early Education, 4-8, Foreign Languages, Home Economics, Language Arts, Mathematics, Science or Social Studies; and K-12, Special Education — MR, Library Science K-12.

*Hours to be taken above requirements for elementary teachers.

ELECTIVES	0-8

	Required Sem. Hr.
PROFESSIONAL EDUCATION	41
C&I 7 — Introduction to Education	2
Ed. P. 103 and 105 — Human Development and Learning	6
C&I 120 — Elementary-Early Childhood Language Arts	3
Rdng. 221 — Developmental Reading	3
Pre-Student Teaching Block:	
C&I 100 — Elementary-Early Childhood General Methods	3
C&I 130 — Elementary-Early Childhood Mathematics	2
C&I 140 — Elementary-Early Childhood Science	2
C&I 150 — Elementary-Early Childhood Social Studies	2
Rdng. 240 — Corrective Language Art	3
Student Teaching	12
C&I 187 — Student Teaching: Elementary-Early Childhood, *or*	
C&I 187 and Sp. Ed. 280 — Elementary Student Teaching and Special Education Student Teaching (6 hours each)	
C&I 280 — Special Problems and Workshops: Student Teaching Seminar	3
EARLY CHILDHOOD EDUCATION N-6	
Required Courses	22
CD&FR 141 and 142 — Child Development	6
CD&FR 244 — Family and Individual in Community	3
C&I 210 and 211 — Early Childhood Education	6
Theat. 282 — Creative Dramatics	3
P.E. 40 — Early Childhood Activities	1
SPA 250 — Speech-Language-Hearing: Development and Disorders	3

It is recommended that the Professional Certificate, Grades 1-6 be endorsed with one subject specialization for teaching in Grades 4 through 8, in Middle Schools. Those wishing certification for teaching at the kindergarten or pre-school level may elect the specialization option. Below are listed the categories of work for each.

Specialization for Grades 4 Through 8

FOREIGN LANGUAGES — GRADES 4-8	
French — Grades 4-8	27
Required Courses	
Frch. 1, 2 — Elementary French	6
Frch. 3, 4 — Intermediate French	6
Frch. 103, 104 — Advanced French	6
Frch. 217 — French Civilization, *or*	
Frch. 292 — Pro-Seminar: French Culture	3
Frch. 231 — Pronunciation and Phonetics	3
LTM 221. (C&I 125) — The Teaching of Foreign Languages	3
Spanish — Grades 4-8	27
Required Courses	
Span. 1, 2 — Elementary Spanish	6
Span. 3, 4 — Intermediate Spanish	6
Span. 103, 104 — Advanced Spanish	6
Span. 116 — Spanish Civilization and Culture	3
Span. 292 — Pro-Seminar: Latin American Culture	3
LTM 221. (C&I 125) — The Teaching of Foreign Languages	3

	Required Sem. Hr.
HOME ECONOMICS — Grades 4-8	24
Required Courses	
Textiles and Clothing	6
Tx&Cl 27 — Introductory Textiles	3
Tx&Cl 121 — Clothing for the Family	3
Foods: Institution Administration	3
FIA 55 — Food Principles and Practices	3
Child Development and Family Relations	6
CD&FR 141 — Child Development I	3
CD&FR 142 — Child Development II	3
CD&FR 244 — Family and Individual in the Community	3
Home Management and Family Economics	3
HM&FE 161 — Family Economics	3
Housing and Design	3
Hou.&D. 35 — Housing and Design	3
Nutrition	3
Nutrn. 71 — Introduction to Human Nutrition	3
SCHOOL LIBRARIAN — Grades K-12	24
(See the Secondary Education Program)	
LANGUAGE ARTS — Grades 4-8	30
Required Courses	27
Rdng. 221 — Developmental Reading	3
Rdng. 240 — Corrective Language Arts Instruction	3
C&I 120 — Elementary-Early Childhood Language Arts	3
L. Sci. 203 — Literature for Children	3
Engl. 111 — The English Language	3
Engl. 233 — Recent Literary Criticism	3
SPA 250 — Speech-Language-Hearing: Dev. and Disorders	3
Rdng. 283 — Workshop: Approaches to Teaching Literature	3
Elective in Composition or Linguistics	3
Approved English electives (select one from list below)	3
Engl. 35, 36, 103, 112, 125, 132, 133, 171, 220, 234, 235, and 240	
MATHEMATICS — Grades 4-8	21
Required Courses	18
Math. 3 — College Algebra	3
Math. 33, 34 — Introductory Math. for Elementary Teachers	6
Math. 131 — Informal Algebra and Geometry for Elem. Teachers	3
Math. 226 — Mathematical Statistics	3
C&I 337 — Mathematics in the Middle School	3
Approved Electives	3
Math. 28 — Finite Mathematics	3
Math. 41 — Algorithmic Linear Algebra	3
Math. 128 — Introduction to Calculus	3
Math. 133 — Introductory Modern Algebra for Teachers	3
Math. 168 — History of Mathematics	3
Math. 239 — Elementary Number Theory	3
Com.S. 1 — Introduction to Computer Science	3

	Required Sem. Hr.
SCIENCE — Grades 4-8	(minimum) 24
Required Courses	
P. Sci. 1, 2 — Physical Science	8
Biol. 1, 2 — General Biology	8
Geol. 2 — Physical Geology Laboratory	1
Geol. 5 — Introduction to Geology	3
Electives	(minimum) 4
Chem. 11, 12 — Survey of Chemistry, *or*	
Biol. 252 — Flora of West Virginia, *or*	
Phys. 1, 2 — Introductory Physics, *or*	
Astro. 106 — Descriptive Astronomy	
SOCIAL STUDIES — Grades 4-8	30
Required Courses	
S. Sci. 1 and 2 — Introductory General Course	6
Hist. 52 and 53 — Growth of the American Nation	6
Hist. 153 — West Virginia, *or*	
Hist. 261 — Economic and Social Development of W. Va.	3
Geog. 7 — Physical Geography, *or*	
Geog. 8 — Human Geography, *or*	
Geog. 105 — Resources, Conservation, and the Environment, *or*	
Geog. 140 — Geography of the United States and Canada	3
Pol. S. 2 — American Federal System	3
Econ. 51 — Principles of Economics	3
Electives in Economics, Geography, History, Political Science, or Sociology and Anthropology	6
SPEECH COMMUNICATION — Grades 4-8	21
Required Courses	
Spch. 106 or 131 — Nonverbal Commun. Lang. Beh.	3
Spch. 11 and 12 — Prin. of Human Communication and Lab	3
Spch. 80 — Introduction to Mass Media	3
Spch. 275 — Communication Problems of Children	3
Theat. 50 — Oral Interpretation	3
Theat. 282 — Creative Dramatics (May substitute Theatre 180 or 284)	3
Speech Communication or Theatre elective	3

MENTALLY RETARDED — Grades K-12

Required Courses	15
Sp. Ed. 250 — Survey of Exceptional Children and Adults	3
Sp. Ed. 255 — Introduction to Mental Retardation	3
Sp. Ed. 260 — Curriculum and Methods for Special Education	3
Sp. Ed. 281 — Sec. 01 — Development Language for the Mentally Retarded, *or*	
Rdng. 283 — Reading and the Exceptional Child	3
SPA 250 — Survey of Oral Communication Disorders	3

Students who wish to be certified to teach the mentally retarded children and youth will earn 6 hours of student teaching at the elementary level and 6 hours in a program for the mentally retarded. *(See Professional Education requirements.)*

PROGRAMS FOR PROFESSIONAL CERTIFICATES JUNIOR AND SENIOR HIGH SCHOOL

Requirements for the Degree of Bachelor of Science in Secondary Education and for Recommendation for the Professional Certificate, Grades 7-12 or K-12

Lower-Division Work

In preparing for admission to the College of Human Resources and Education and the work of preparing for teaching in the junior and senior high school, students will register for the freshman and sophomore years in the College of Arts and Sciences and pursue their prescribed program in preparation for teacher certification under the direction of the pre-education adviser.

Upper-Division Work

Upon completing 58 semester hours of approved college work a student is eligible to enter the College of Human Resources and Education. To become eligible for recommendation for the degree of Bachelor of Science in Education and for the Professional Certificate, Grades 7-12, the student must complete the requirements described in the General Requirements for the Professional Certificate. The College will lend guidance and advice to students in any other department of the University who desire secondary teacher certification.

An overall grade-point average of 2.25 is required for admission to student teaching.

Programs for Secondary School Teachers

	Required Sem. Hr.
1. GENERAL STUDIES	44-46
Required Courses	
Engl. 1 and 2 — Composition and Rhetoric	6
Humanities	12
Literature	3
Appreciation or Survey of Fine Arts	3
Religious Studies, Philosophy, Humanities, Composition, Linguistics, Foreign Language	3
Electives in any area of Humanities	3
Science-Mathematics	11-12
(At least 3 semester hours in science and 3 semester hours in mathematics)	
Social Science	12
History	3
Multidisciplinary Studies, Sociology and Anthropology, or Social Science	3
Physical Education and Health Education	4
School Health Education	2
Physical Education	2
2. PROFESSIONAL EDUCATION — SECONDARY	
Required Courses	32
Foundation for Teaching	8
C&I 7 — Introduction to Education	2
Ed. P. 103 — Human Development and Learning	3
Ed. P. 105 — Human Development and Learning	3

	Required Sem. Hr.
Teaching Methods in Area of Specialization (To be scheduled with General Methods (below) and completed before student teaching semester.)	3-6
Select those related to teaching field:	
C&I 124 — Teaching Language Arts: Secondary School	3
C&I 134 — Teaching Mathematics: Secondary School	3
C&I 144 — Teaching Science: Secondary School	3
C&I 154 — Teaching Social Studies: Secondary School	3
Ag. Ed. 160 (C&I 160) — Methods High Sch. Tchg. of Agr.	3
Art 165 (C&I 165) — Art Education in Elementary School	3
Art 166 (C&I 166) — Art Education in Secondary School	3
H.E.Ed. 175 (C&I 175) — Methods of Teaching Home Economics	3
H.E.Ed. 278 (C&I 278) — Vocational Home Economics	3
LTM 221 (C&I 125) — Language Teaching Methods	3
Music 151 (C&I 167) — Music Education I	3
Music 152 (C&I 168) — Music Education II	3
P.E. 125 — Movement Education for Children	3
P.E. 130 (C&I 174) — Methods of Teaching Physical Education	3
Spch. 201 — Principles of Communication Education	3
General Methods	6
C&I 104 — Principles of Teaching in Secondary Schools	4
Rdng. 222 — Reading in the Content Areas	2
Practicum	15
Select according to teaching level and fields:	
C&I 188 — Secondary Student Teaching	12
C&I 187 *and* C&I 188 — Elementary *and* Secondary Student Teaching (6 hours each)	12
C&I 188 *and* Sp. Ed. 280 — Secondary Student Teaching *and* Special Education Student Teaching (6 hours each)	12
C&I 280 — Workshop Problems — Student Teaching	3

3. TEACHING FIELDS — Grades 7-9, 7-12, and K-12

VOCATIONAL AGRICULTURE — Grades 7-12 (Single Teaching Field) 45

Required Courses — Core Program*	28
Ag. Ec. 104 — Farm Management	3
Ag. Ed. 162 — Group Organization and Leadership	2
Agr. M. 152 — Shop Theory and Methods	3
Agr. M. 253 — Advanced Farm Machinery, *or* Agr. M. 259 — Farm Structures, *or* Agr. M. 270 — Electricity in Agriculture, *or* Agr. M. 275 — Agricultural Engines	3
A&VS 51 — Principles of Animal Science	4
Pl. Sc. 52 — Principles of Plant Science	4
Agron. 2 — Principles of Soil Science	4
Selected Agricultural Electives**	5

*Substitutions for core program courses may be made, if necessary, with equivalent courses and credit hours.

**Electives, to be selected in consultation with adviser, are based on individual student needs.

Areas of Agricultural Minors (select one)

Agricultural Production and Management 17

Courses selected from among the following:***

An. Nu. 101; An. Pr. 108, 137, 138, 141, 142, 144, 145, 146, 240; Fd. Sc. 167; Vet. S. 102; F. Man. 132; Agron. 210, 212, 251, 252, 254; Ento. 204; Hort. 107, 115, 117, 204; P. Pth. 201; Ag. Ec. 200, 206, 231, 235, 240; Agr. M. 253, 259, 270, 275; A&VS 180; Pl. Sc. 180; Res. M. 180.

	Required Sem. Hr.
Animal Processing	17
Courses selected from among the following:*** Fd. Sc. 106, 107, 112, 130, 134, 167, 267; Vet. S. 102; Bact. 141; An. Pr. 138, 139, 141, 145, 146, 240; A&VS 180.	
Agricultural Mechanics	17
Courses selected from among the following:*** Agr. M. 152, 253, 259, 270, 275, 352; Agr. E. 280; I.E. 7, 8; Res. M. 180.	
Agricultural Sales and Services	17
Courses selected from among the following:*** Ag. Ec. 10, 200, 231, 235, 240, 261, 330; Ag. Ed. 264; Mrktg. 111, 120; Res. M. 180.	
Conservation	17
Courses selected from among the following:*** F. Man. 12, 122, 132, 151, 211; For. 140, 218, 219; Agron. 115, 210, 212, 250; L. Arc. 229; Rc. & Pk. 40, 142; Biol. 51; Wd. Sc. 121, 123, 130; Pl. Sc. 180.	
Horticulture Produce Industry	17
Courses selected from among the following:*** Hort. 107, 115, 117, 204, 242, 243, 244, 245; P. Pth. 201; Ento. 204; Pl. Sc. 200, 201; Agron. 210; Pl. Sc. 180.	
Ornamental Horticulture	17
Courses selected from among the following:*** Hort. 116, 151, 162, 204, 245; Agron. 210, 250; L. Arc. 229; Ento. 204; P. Pth. 201; Pl. Sc. 180; Res. M. 180.	

***Credit hours selected from among available courses, in consultation with adviser, based on individual student needs.

ART — Grades K-12 (Single Teaching Field)	60
Two-Dimensional Studio and Design	27
Art 11, 12 — Drawing	6
Art 113, 114 — Painting	6
Art 121 — Visual Foundation	3
Art 123 or 124 — Graphic Design	3
Art 130 — Printmaking	3
Art 140 — Ceramics	3
Art 211 — Figure Drawing	3
Three-Dimensional Studio and Design	12
Art 122 — Visual Foundation	3
Art 126, 127 — Modeling-Sculpture	6
Art (Advanced Studio Elective)	3
Art History and Theory	12
Art 105, 106 — Survey of Art	6
Art/C&I 165 — Art Education in the Elementary School	3
Art/C&I 166 — Art Education in the Secondary School	3
Electives in Art	9
Electives (Art)	6
Electives (Creative Arts Center)	3

	Required Sem. Hr.
ATHLETIC TRAINING — Grades 7-12 (Combined with another teaching field)	33
(This is an experimental program not previously listed. Student must be accepted by the Athletic Training Coordinator.)	
P.E. 121 — Sport Injury Control and Management	3
P.E. 164 — Kinesiology	3
P.E. 165 — Physiology of Motor Activities	3
P.E. 176 — Adapted Program in Physical Education	2
P.E. 221 — Advanced Athletic Training	3
P.E. 222 — Advanced Athletic Training	3
P.E. 223 — Athletic Training Practice	3
Saf. S. 70 — First Aid and Emergency Care	3
Hl. Ed. 70 — The Individual and His Health	3
Biol. 266 — Human Physiology	4
Anat. 102 — Gross Anatomy	3
ENGLISH — Grades 7-12 (To be combined with another specialization)	50
Engl. 1, 2 — Composition and Rhetoric	6
Engl. 108 — Advanced Composition (specially designated section)	3
Lingu. 1 — Introduction to Language	3
Engl. 111 — The English Language	3
Engl. 21, 22 — English Literature Surveys	6
Engl. 24, 25 — American Literature Surveys	6
Two three-hour electives in English	6
Engl. 125 — World Literature	3
Approved elective in regional, ethnic, or minority literature	3
Engl. 294 — Fiction for Adolescents	3
Engl. 293 — Practicum in Teaching Composition	1
Engl. 295 — Approaches to Teaching Composition	3
C&I 224 — Approaches to Teaching Language	2
C&I 225 — Approaches to Teaching Literature	2
FOREIGN LANGUAGES — Grades 7-12	
FRENCH (To be combined with another teaching field)	36
Required Courses	
Frch. 1, 2 — Elementary French	6
Frch. 3, 4 — Intermediate French	6
Frch. 103, 104, 109, 110 — Advanced French	12
Frch. 111 — French Lit. from Middle Ages to Eighteenth Century	3
Frch. 112 — La Lit francaise de Louis XV a deGaulle	3
Frch. 217 — French Civilization, *or*	
Frch. 292 — Pro-Seminar: French Culture	3
Frch. 231 — Phonetics and Pronunciation, *or*	
Lingu. 247 — Structure of Modern French	3
GERMAN (To be combined with another teaching field)	36
Required Courses	
Ger. 1, 2 — Elementary German	6
Ger. 3, 4 — Intermediate German	6
Ger. 103, 104, 109, 110 — Advanced German	12
Ger. 265 — German Civilization, *or*	
Ger. 292 — Pro-Seminar: German Culture	3
Lingu. 111 — Introduction to Structural Linguistics, *or*	
Lingu. 257 — Structure of German	3
Approved Electives in German Literature	6

	Required Sem. Hr.
RUSSIAN (To be combined with another teaching field)	36
Required Courses	
Russ. 1, 2 — Elementary Russian	6
Russ. 3, 4 — Intermediate Russian	6
Russ. 103, 104, 109, 110 — Advanced Russian	12
Russ. 144, 145 — Survey of Russian Literature	6
Lingu. 111 — Introduction to Structural Linguistics, *or* Lingu. 267 — Structure of Russian	3
Russ. 292 — Pro-Seminar: Russian Culture	3
SPANISH (To be combined with another teaching field)	36
Required Courses	
Span. 1, 2 — Elementary Spanish	6
Span. 3, 4 — Intermediate Spanish	6
Span. 103, 104, 109 — Advanced Spanish	9
Span. 116 — Spanish Civilization and Culture	3
Span. 292 — Pro-Seminar: Latin American Culture	3
Lingu. 111 — Introduction to Structural Linguistics, *or* Lingu. 217 — Structure of Spanish	3
Approved Electives in Spanish or Latin American Literature	6
LATIN (To be combined with another teaching field)	36
Required Courses	
Class. 1, 2 — Elementary Latin	6
Class. 3 — Intermediate Latin	3
Class. 4 — Cicero's Orations	3
Class. 101 — Greek and Roman Civilization and Culture	3
Class. 102 — Greek and Roman Myths	3
Class. 109 — Selections from Roman Prose	3
Class. 110 — Selections from Roman Poetry	3
Lingu. 111 — Introduction to Structural Linguistics	3
Approved Electives in Classics	9
PHYSICAL EDUCATION K-12 and 7-12 (To be combined with another teaching field)	
(Students who wish to be certified in physical education, grades K-12, will do student teaching at the elementary and secondary levels.)	
Theory and Foundations	38 33
P.E. 71 — Introduction to Physical Education	2
P.E. 72 — Sociological and Psychological Perspectives of Sport	3
P.E. 74 — Motor Learning	3
P.E. 110 — Elementary Rhythms and Games (K-12 only)	2
P.E. 121 — Sport Injury Control and Management	3
P.E. 125 — Movement Education for Children (K-12 only)	3
P.E. 130 — (C&I 174). Methods of Teaching Physical Education	3
P.E. 131 — Program Assisting	1
P.E. 156 — Principles and Problems of Coaching	2
P.E. 157 — Techniques of Coaching	1
P.E. 164 — Kinesiology	3
P.E. 165 — Physiology of Motor Activities	3
P.E. 177 — Historical and Philosophical Perspectives of Sport	3
P.E. 191 — Measurement and Evaluation in Physical Education	3
P.E. 192 — Organization and Administration of Physical Education	3

		Required Sem. Hr.
Sport and Movement Analysis	12	12
Students must select one of the following tracks:		
Track I:		
1. P.E. 51 — Gymnastics and Volleyball	2	
P.E. 61 — Gymnastics	2	2
P.E. 62 — Advanced Gymnastics	2	
2. P.E. 52 — Aquatics	2	
P.E. 58 — Synchronized Swimming	2	2
P.E. 124 — Water Safety Instructorship	2	
3. P.E. 54 — Badminton, Golf, Handball, and Tennis	2	2
P.E. 64 — Archery, Bowling, and Fencing	2	
4. P.E. 31 — Soccer and Track and Field	2	
P.E. 32 — Basketball and Softball	2	
P.E. 53 — Soccer and Wrestling	2	4
P.E. 55 — Baseball and Basketball	2	
P.E. 56 — Track and Field and Football	2	
P.E. 63 — Field Hockey and Volleyball	2	
5. Dance 35 — Theory and Practice of Modern Dance Techniques	2	
Dance 37 — Adv. Dance Tech. with Principles of Choreography	2	2
Dance 39 — Folk and Ballroom Dance	2	
Track II:		
1. P.E. 51 — Gymnastics and Volleyball	2	
P.E. 61 — Gymnastics	2	2
P.E. 62 — Advanced Gymnastics	2	
2. P.E. 52 — Aquatics	2	
P.E. 58 — Synchronized Swimming	2	2
P.E. 124 — Water Safety Instructorship	2	
3. P.E. 54 — Badminton, Golf, Handball, and Tennis	2	2
P.E. 64 — Archery, Bowling, and Fencing	2	
4. P.E. 31 — Soccer and Track and Field	2	
P.E. 32 — Basketball and Softball	2	
P.E. 53 — Soccer and Wrestling	2	
P.E. 55 — Baseball and Basketball	2	2
P.E. 56 — Track and Field and Football	2	
P.E. 63 — Field Hockey and Volleyball	2	
5. Dance 35 — Theory and Practice of Modern Dance Techniques	2	
Dance 37 — Adv. Dance Tech. with Principles of Choreography	2	4
Dance 39 — Folk and Ballroom Dance	2	
HOME ECONOMICS — Grades 7-12 (Single Teaching Field)	45	
Required Courses (Core)	15	
CDFR 144 — Introduction to Marriage and the Family	3	
Tx & Cl 22 — Principles of Clothing Construction, *or* Tx & Cl 224 — Flat Pattern Design	3	
Nutrn. 71 — Introduction to Nutrition	3	
HM&FE 165 — Home Management: Principles and Applications	3	
Hou & D 31 — Introduction to Design	3	
Required Courses	30	
CDFR 142 — Child Development	3	
CDFR 245 — Adolescent Development	3	
Tx & Cl 27 — Introductory Textiles	3	
Tx & Cl 121 — Clothing for the Family	3	
FIA 55 — Food Principles and Practices	3	
FIA 151 — Meal Management	3	
HM&FE 161 — Family Economics	3	
HM&FE 261 — Consumer Economics	3	
Hou & D 33 — Housing Design	3	
HM&FE 167 — Household Equipment	3	

	Required Sem. Hr.
JOURNALISM — Grades 7-12 (To be combined with another teaching field)	21
Required Courses	18
Journ. 1 — Introduction to Mass Communications	3
Journ. 18 — News Writing	3
Journ. 19 — Copy Editing and Make-up	3
Journ. 120 — Introduction to Photography	3
Journ. 225 — High School Publications Advising	3
Journ. 227 — History of Journalism	3
Recommended Electives	3
Journ. 50 — Visual Communication	3
Journ. 110 — Typography and Printing Processes	3
Journ. 113 — Principles of Advertising	3
Journ. 118 — Advanced Reporting and Editing	3
Journ. 141 — Advanced Journalism Problems	1-3
Journ. 182 — Broadcast Journalism	3
Journ. 228 — Law of the News Media	3
Journ. 230 — Editorial and Critical Writing	3
MATHEMATICS — Grades 7-12 (To be combined with another teaching field)	30
Required Courses	
Math. 15, 16, 51 — Calculus I, II, III	12
Math. 133 — Introductory Algebra for Teachers	3
Math. 41 — Algorithmic Linear Algebra, *or*	
Math. 241 — Introduction to Linear Algebra	3
Math. 138 — Modern Geometry for Teachers	3
Math. 226 — Mathematical Statistics	3
Approved Electives	6
Math. 113 — Differential Equations	3
Math. 123 — Introduction to Numerical Procedures	3
Math. 163 — Introduction to Concepts of Math	3
Math. 168 — History of Mathematics	3
Math. 181 — Introduction to Analysis and Topology	3
Math. 215 — Applied Modern Algebra	3
Math. 223 — Applied Matrix Algebra	3
Math. 239 — Elementary Number Theory	3
Math. 251 — Introduction to Real Analysis	3
Math. 252 — Introduction to Real Analysis	3
Math. 291 — Theory of Probability	3
Com. S. 1 — Introduction to Computer Science	3
MUSIC — Grades K-12 (Single Teaching Field)	74
Required Courses	
Music 61-68 — Music Theory	16
Music 44-47 or Music 48 — Instrumental Pedagogy	3-7
(The higher number of hours required for instrumental emphasis majors.)	
Music 248 — Music Arranging for Public School Groups	2
Music 31, 33, 34 — Music Listening, Music History	6
Music 151, 152 (C&I 167, 168) — Music Education	6
Music 51 — Conducting and Rehearsing	6
Music 100-105 — Major Performance Groups	4
(For instrumental emphasis majors, these hours must be in either Music 100 Band or Music 103 Symphony Orchestra. For vocal emphasis majors, these hours must be in either Music 102 Choral Union or Music 105 Choir.)	

Required Sem. Hr.

Music 240 — Clinic Chorus, Band and Orchestra 2-4
(The higher number of hours required for instrumental emphasis majors.)
Music 110 — Applied Music (major performance medium) 12
(Student must achieve grade level 7.)
Music 110 — Applied Music (voice and piano) 4-6
(Vocal emphasis majors must achieve grade level 3 in voice and grade level 3 in piano. Instrumental emphasis majors must achieve grade level 2 in piano.)

Required of Vocal Emphasis Majors Only:
Music 49 — Vocal Pedagogy 2
Music 19 — Introduction to Opera Theatre 2

Required of Instrumental Emphasis Majors Only:
Music 115 — Chamber Music 1
Music 100 — Marching Band 1

Electives 5

SAFETY STUDIES — GRADES 7-12 (To be combined with another specialization) 18
(Approved as a second teaching field. *Note:* Students with specialization in Safety Education should select Ed. P. 260 of their program of Professional Education.)

Required Courses
Saf. S. 70 — First Aid and Emergency Allied Services 3
Saf. S. 131 — Accident Prevention Control Principles 3
Saf. S. 151 — Driver and Highway Safety Foundations 3
Saf. S. 232 — Safety Education Principles and Contest 3
Saf. S. 254 — Teaching Driver and Highway Safety 3
Saf. S. 256 — Driver and Safety Instructional Innovations 3

SCHOOL LIBRARIAN — Grades K-12 (To be combined with another teaching field) ... 21
(Student teaching must be done in the other teaching field.)

Required Courses
L. Sci. 201 — Reference and Bibliography 3
L. Sci. 203 — Library Materials for Children 3
L. Sci. 205 — Selection of Books and Related Materials for the Secondary School Library 3
L. Sci. 207 — Organization and Administration of the Instructional Materials Center in the Secondary School 3
L. Sci. 222 — Field Practice 3
L. Sci. 223 — Cataloging and Classification 3
L. Sci. 235 — Organization and Administration of the Instructional Materials Center in the Elementary School 3
Ed. P. 260 — Instructional Media and Technology 3

SOCIAL STUDIES — Grades 7-12 Comprehensive (Single Teaching Field) 54

Required Courses
Hist. 1 — West. Civ.: Antiquity to 1600, *or*
Hist. 2 — West. Civ.: 1600 to Present 6
Hist. 52, 53 — Growth of the American Nation 6
Hist. 153 — West Virginia, *or*
Hist. 261 — Economic and Social Development of West Virginia 3
Geog. 7 — Physical Geography 3
Geog. 8 — Human Geography 3
Geog. 109 — Economic Geography, *or*
Geog. 140 — Geography of United States and Canada, *or*
Geog. 141, 142, 143, 144, 145 or 210 3
Econ. 51 — The Economic System 3
Econ. 52 — Contemporary Economic Issues 3

	Required Sem. Hr.
Pol. S. 2 — American Federal System	3
Pol. S. — 1, 120, 160, or 221	3
Soc. & A. 1, 5, or 7	3
Soc. & A. 140	3
Soc. & A. 122 or 222 or 135	3
Electives in History, Geography, Sociology and Anthropology, Political Science, Economics, or Psychology	9

SOCIAL STUDIES — Grades 7-9 (Combined with K-12 or 7-12 specialization) 24

Required Courses

Hist. 52, 53 — Growth of the American Nation	6
Hist. 153 — West Virginia History, *or* Hist. 261 — Economic and Social Development of West Virginia	3
Geog. 7 — Physical Geography, *or* Geog. 8 — Human Geography	3
Geog. 109 — Economic Geography, *or* Geog. 140 — Geography of the United States and Canada	3
Pol. S. 2 — American Federal System	3
Econ. 51 — Principles of Economics	3
Soc. & A. 1 — Introduction to Sociology, *or* Soc. & A. 5 — Introduction to Anthropology, *or* Soc. & A. 7 — Introduction to Social Problems, *or* Soc. & A. 122 — The Community	3

MENTALLY RETARDED, K-12 — SECONDARY EDUCATION MAJORS
(For the complete program, see the Special Education section.)

SPEECH COMMUNICATION — Grades 7-12 (To be combined with another teaching field) 36

Required Courses

Spch. 11 and 12 — Human Communication and Lab	3
Spch. 80 — Introduction to the Mass Media	3
Spch. 106 — Non-Verbal Communication or Spch. 131 — Human Communication and Language Behavior	3
Spch. 107 — Communication and Decisions	3
Spch. 133 — Interpersonal Communication	3
Spch. 180 — Effects of Mass Communication	3
Spch. 201 — Principles of Communication Education	3
Theat. 50 — Oral Interpretation	3
Theat. 75 — Acting	3
Theat. 100 — Stagecraft	3
Theat. 180 — Directing	3
Spch. 275 — Communication Problems of Children	3

BIOLOGICAL SCIENCES — Grades 7-12 (To be combined with another teaching field) 26-30

(**Note:* Due to general public school hiring practices and because of the interrelationships of concepts in science, it is strongly recommended that students who wish a specialization in biological sciences take their second 7-12 specialization in mathematics, chemistry, physics, or general science.)

Required Courses 24

Biol. 1, 2 — General Biology	8
Biol. 101 — Animals As Organisms	4
Biol. 102 — Plants As Organisms	4
Biol. 103 — Population Biology	4
Biol. 104 — Cellular and Molecular Biology	4
Econ. 51 — The Economic System	3
Econ. 52 — Contemporary Economic Issues	3

	Required Sem. Hr.
Approved Electives	6
For. 140 — West Virginia's Natural Resources	3
Bact. 141 — General Bacteriology	4
(or any of the 200-level courses in Biology — other than Biol. 209)	
Chem. 15 — Foundations of Chemistry	4
Chem. 16 — Foundations of Chemistry	4
Phys. 1 — Introductory Physics	4
Phys. 2 — Introductory Physics	4
Geol. 1 — Physical Geology	2
Geol. 2 — Physical Geology	2
Geol. 3 — Historical Geology	2
Geol. 4 — Historical Geology	2

CHEMISTRY — Grades 7-12 (To be combined with another teaching field) 30

(**Note:* Due to general public school hiring practices and because of the interrelationships of concepts of science it is strongly recommended that students who wish a specialization in chemistry take their second 7-12 specialization in mathematics, biology, physics, or general science.)

Required Courses	24
Chem. 15 — Fundamentals of Chemistry	4
Chem. 16 — Fundamentals of Chemistry	4
Chem. 115 — Introductory Analytical Chemistry	4
Chem. 133-135 — Organic Chemistry	4
Chem. 134-136 — Organic Chemistry	4
Chem. 141-142 — Physical Chemistry, *or*	
Chem. 246, 247 — Introduction to Physical Chemistry	4
Approved Electives*	6
Phys. 1 — Introductory Physics	4
Phys. 2 — Introductory Physics, *or*	4
Phys. 11 — General Physics	4
Phys. 12 — General Physics	4
Geol. 1 — Physical Geology	3
Geol. 2 — Physical Geology	1
Geol. 3 — Historical Geology	3
Geol. 4 — Historical Geology	1
Chem. 201 — Chemistry Literature	2
Chem. 210 — Instrumental Analysis	3
Chem. 235 — Methods of Structure Determination	4

GENERAL SCIENCE — Grades 7-12 (To be combined with another teaching field) 38

(**Note:* If the second teaching field is also a science, the general science electives must be chosen in an area other than that teaching field.)

Required Courses	32
Biol. 1 — General Biology	4
Biol. 2 — General Biology	4
Chem. 11 and 12 — Survey of Chemistry, *or*	
Chem. 15 and 16 — Foundations of Chemistry	8
(If your second field is Chemistry)	
Phys. 1 and 2 — Introductory Physics, *or*	
Phys. 11 and 12 — General Physics	8
Geol. 1 — Physical Geology	3
Ghol. 2 — Physical Geology	1
Geol. 3 — Historical Geology	3
Geol. 4 — Historical Geology	1

	Required Sem. Hr.
Approved Electives	6
Biol. 101 — Animals as Organisms	4
Biol. 102 — Plants As Organisms	4
Biol. 103 — Population Biology	4
Biol. 104 — Cellular & Molecular Biol.	4
Biol. 141 — General Bacteriology (or any of the Biology 200-level courses except Biol. 209)	4
Chem. 115 — Intro. Anal. Chem.	4
Chem. 131 or 133-135 — Org. Chem.	4
Chem. 141-142 — Physical Chemistry	4
Chem. 201 — Chemical Literature	2
Phys. 5 — Hist. & Concept of Phys.	3
Phys. 124 — Intro. Mod. Phys.	4
Phys. 117 — Descriptive Meteorology	3
Phys. 8 — Light, Vision and Color	3
Phys. 7 — Physics of Music	3
Phys. 116 — Photography	3
Astro. 106 — Descr. Astro.	3
Geol. 151 — Structural Geology	4
Geol. 127 — Map Interpretation	2
Geol. 184-185 — Mineralogy	4-8
Geol. 221 — Geomorphology	3
Geol. 222 — Glaciology	3
Geol. 231-235 — Paleontology	4-8
Geol. 294 — Introductory Geochem.	4
For. 140 — W. Va.'s Nat. Resources	3

PHYSICS — Grades 7-12 (To be combined with another teaching field) 28-30

(**Note:* Due to general public school hiring practices and because of the interrelationship of concepts in science it is strongly recommended that students who wish a specialization in Physics take their second 7-12 specialization in mathematics, chemistry, biology, or general science.)

Either of the two programs below will satisfy the requirements for the 7-12 specialization in Physics.

PROGRAM A

Required Courses 24

(No Calculus prerequisite)

- Phys. 5 — History and Concepts of Physics 3
- Phys. 1 — Introductory Physics 4
- Phys. 2 — Introductory Physics 4
- Phys. 124 — Introductory Modern Physics 4
- Phys. 117 — Descriptive Meteorology 3
- Phys. 7 — Physics of Music 3
- Phys. 8 — Light, Vision, and Color 3

Approved Electives 6

- Phys. 116 — Photography, *or* Phys. 357 — Photography 3
- Astro. 106 — Descriptive Astronomy, *or* Phys. 359 — Astrophysics 3
- Phys. 354 — Outline of Modern Physics 3
- Phys. 313 — Introductory Electronics 3
- Phys. 355 — Workshop for Physics Teachers 3
- Chem. 15 — Foundations of Chemistry 4
- Chem. 16 — Foundations of Chemistry 4
- Math. 15 — Calculus 4
- Math. 16 — Calculus 4
- Geol. 1 — Physical Geology 3
- Geol. 2 — Physical Geology 1
- Geol. 3 — Historical Geology 3
- Geol. 4 — Historical Geology 1

PROGRAM B

Required Courses 22

(Prerequisite: Calculus 15 and 16)

- Phys. 5 — History and Concepts of Physics 3
- Phys. 11 — General Physics 4
- Phys. 12 — General Physics 4
- Phys. 124 — Introductory Modern Physics 4
- Phys. 231 — Theoretical Mechanics 3

	Required Sem. Hr.
Phys. 233 — Introductory Electricity and Magnetism	3
Phys. 241 — Advanced Physics Laboratory	1
Approved Electives	6-8
Phys. 232 — Theoretical Mechanics	3
Phys. 234 — Introductory Electricity and Magnetism	3
Phys. 283 — Thermodynamics	3
Phys. 251 — Introductory Quantum Mechanics	3
Phys. 271 — Solid State Physics	3
Phys. 241 — Advanced Physics Laboratory	2-4
Chem. 15 — Foundations of Chemistry	4
Chem. 16 — Foundations of Chemistry	4
Geol. 1 — Physical Geology	3
Geol. 2 — Physical Geology	1
Geol. 3 — Historical Geology	3
Geol. 4 — Historical Geology	1

Courses of Instruction

C&I 7 and Ed. P. 105 are prerequisite to all other courses in Education.

No courses in Education, except C&I 7, Ed. P. 105 and 106, are open to sophomores.

Curriculum and Instruction (C&I)

7. *Introduction to Education.* I, II, S. 2 hr. Concepts underlying the educational system in the American society. Gives the student experience in identifying the student's values, attitudes, and feelings with those of today's community and youth. Includes a required field experience. *(Speech and hearing screening required.)*

100. *Elementary-Early Childhood General Methods.* I, II. 3 hr. PR: C&I 7, Ed. P. 105, 106. Introduction to education, including analysis of professional problems and procedures in school systems. Includes a required field experience. *(To be taken during pre-student teaching block.)*

104. *Principles of Teaching in Secondary Schools.* I, II, S. 3 hr. General professional education course emphasizing methods applicable to all academic areas. *(Not available to undergraduates during Summer.)*

120. *Elementary-Early Childhood Language Arts.* I, II, S. 3 hr. PR: C&I 7, Rdng. 221. Instructional practices to develop communication skills of listening, speaking and writing.

124. *Teaching Language Arts: Secondary School.* I, II. 3 hr. Includes an examination and application of relevant curricular materials and teaching techniques. *(Course will not be offered in Spring, 1979-80.)*

125. *Foreign Language.* I, II, S. 3 hr. Methods and materials in the secondary school. *(Also listed as Foreign Language 221.)*

126. *Library Science.* I, II. 2 hr. Methods and materials of high school teaching.

130. *Elementary-Early Childhood Mathematics.* I, II. 3 hr. PR: Math. 33, 34, C&I 7, Ed. P. 105, 106. Materials and methods for teaching of mathematics with emphasis on the use of manipulative devices and activity learning for development of mathematical concepts. Includes a required field experience. *(To be taken during pre-student teaching block.)*

134. *Teaching Mathematics: Secondary School.* I, II. 3 hr. Includes an examination and application of relevant curricular materials and teaching techniques. *(Course will not be offered in Spring, 1979-80.)*

140. *Elementary-Early Childhood Science.* I, II. 3 hr. PR: P. Sci. 1, Biol. 1, C&I 7, Ed. P. 105, 106. Modern methods and materials for teaching science with emphasis on in-

vestigative skills and attitudes. Includes a required field experience. *(To be taken during pre-student teaching block.)*

144. *Teaching Science: Secondary School.* I, II. 3 hr. Includes an examination and application of relevant curricular materials and teaching techniques. *(Course will not be offered in Spring, 1979-80.)*

150. *Elementary-Early Childhood Social Studies.* I, II. 3 hr. PR: 12 hr. Social Studies, C&I 7, Ed. P. 105, 106. Study of materials and activity oriented procedures for the teaching of social studies. Includes a required field experience. *(To be taken during the pre-student teaching block.)*

154. *Teaching Social Studies: Secondary School.* I, II. 3 hr. Includes an examination and application of relevant curricular materials and teaching techniques. *(Course will not be offered in Spring, 1979-80.)*

160. *Vocational Agriculture.* I, II. 3 hr. Methods and materials of high school teaching. *(Also listed as Ag. Ed. 160.)*

165. *Art Education in the Elementary School.* I. 3 hr. *(Also listed as Art 165.)*

166. *Art Education in the Secondary School.* II. 3 hr. *(Also listed as Art 166.)*

167. *Materials and Methods in Elementary-School Music.* I, II. 3 hr. *(Also listed as Music 151.)*

168. *Music Education.* I, II, S. 3 hr. Methods and materials in secondary school music. *(Also listed as Music 152.)*

174. *Physical Education.* I, II. 3 hr. Methods of teaching physical education. *(Also listed as P.E. 130.)*

175. *Home Economics.* I, II. 3 hr. Methods and materials of high school teaching. *(Also listed as CD&FR 175.)*

187. *Student Teaching: Elementary-Early Childhood.* I, II. 4-12 hr. PR: For elementary and early childhood undergraduates who meet eligibility requirements and other guidelines. (Applicable to preschool, nursery, day care, child care, kindergarten, primary grade, or elementary school.) Experiences with children 3-5 years of age are required of all students in Early Childhood.

1. At the time of application for student teaching have a minimum overall grade-point average of 2.25 and a 2.25 average in both specialization and education course work. The above requirements must also be met at the beginning of the student teaching semester.
2. Have completed all courses in education and three-fourths of course work required in area of specialization before the student teaching semester.
3. Submit positive evidence that applicant meets requirements of physical condition and emotional stability necessary for performance of duties as a teacher.
4. Exhibit reading, writing, speaking, and hearing proficiencies necessary for the teaching profession. Remediation will be required before student teaching for those who do not demonstrate acceptable competencies.
5. Admission is by application made before March 1 of the preceding year to the Director of Student Teaching.
6. Additional courses may not be taken with student teaching block.
7. Student teaching will be done in selected centers throughout the state. Therefore, students should be prepared to live off-campus if so assigned.

   NOTE: Students must avoid employment, social commitments, or housing contracts which would interfere with an off-campus assignment.

188. *Student Teaching: Secondary Education.* I, II. 4-12 hr. PR: Students enrolled in Secondary Education undergraduate programs who meet eligibility requirements and other guidelines:

1. At the time of application for student teaching have a minimum overall grade-point average of 2.25, 2.25 average in course work in the teaching fields, and 2.25 average in education course work. The above requirements must also be met at the beginning of the student teaching semester.
2. Have completed all courses in education and three-fourths of course work required in each teaching field before the student teaching semester.
3. Submit positive evidence that applicant meets requirements of physical condition and emotional stability necessary for performance of duties of a teacher.
4. Exhibit reading, writing, speaking, and hearing proficiencies necessary for the teaching profession. Remediation will be required before student teaching for those who do not demonstrate acceptable competencies.
5. Admission is by application made before March 1 of the preceding year to the Director of Student Teaching.
6. Additional courses may not be taken with student teaching block.
7. Student teaching will be done in selected centers throughout the state. Therefore, students should be prepared to live off campus if so assigned.

   NOTE: Students must avoid employment, social commitments, or housing contracts which would interfere with an off-campus assignment.

205. *The Junior High School*: I, II, S. 2 hr. PR: Consent. Developing philosophy, program, and practices of the junior high school.

210. *Early Childhood Education I.* I, II, S. 3 hr. PR: CD&FR 142, Ed. P. 106. Introduction to methods and materials in early childhood education curriculum, instruction and program organization, development and evaluation. The content of this course is applicable to field placement in a preschool, nursery school, day care, and/or child care center. *(A field experience with children 3-5 years of age is required.)*

211. *Early Childhood Education II.* I, II, S. 3 hr. PR: CD&FR 142, Ed. P. 106. This course is designed for individuals who will be working with early childhood programs for children under eight years of age. The various aspects of early childhood education are studied in relationship to organizational and administrative structures. This includes planning, budgeting, staffing, supervising, and evaluating comprehensive learning facilities for young children. *(A field experience with children 3-5 years of age is required.)*

224. *Approaches to Teaching Language.* II. 2 hr. PR: Lingu. 1 and Engl. 3. Designed for prospective teachers of English and language arts. Focus is upon planning and implementing methods of teaching English as a language. Materials and resources appropriate for public school instruction are analyzed and utilized.

225. *Approaches to Teaching Literature.* II. 2 hr. PR: Junior standing. Designed for prospective teachers of English and language arts. Course focuses upon methodologies for teaching literature in public schools. Workshop format will provide opportunities for peer teaching activities as students apply methods of teaching literature.

237. *Mathematics in the Junior High School and Middle School.* SII. 3 hr. PR: 6 hr. of college mathematics or consent. Teaching mathematics in junior high school or middle school; application of mathematics content to teaching; instructional techniques and materials.

267. *The Music Education Program.* S. 3 hr. PR: Consent. Organization and administration of the complete music education program for grades 1-12. *(Course will not be offered in 1979-80.)*

278. *Vocational Home Economics in Secondary Schools.* I. 3 hr. PR: Ed. P. 106; 25 hr. in family resources.

279. *Organization Administration of Physical Education.* 3 hr. *(Also listed as P.E. 192.)*

280. *Special Problems and Workshops.* I, II, S. 2-4 hr. PR: 14 hr. in education. Credits for special workshops and short intensive unit courses on methods, supervision, and other special topics. Maximum of 8 semester hours may be applied toward the master's degree.

287. *Advanced Clinical Experience.* I, II, S. 1-6 hr. PR: Consent. Clinical experience in teaching-learning situations at any level.

Educational Psychology (Ed. P.)

103. *Human Development and Learning.* I, II, S. 3 hr. Emphasis on development, standardized measurement, and classroom management.

105. *Human Development and Learning.* I, II, S. 3 hr. Emphasizes competencies in applying principles of learning and measurement in classroom instruction.

231. *Sampling Methods.* I. 3 hr. PR: An introductory course in statistics. Methods of sampling from finite and infinite populations, choice of sampling unit, sample survey design, estimation of confidence limits and optimum sample size, and single and multi-stage sampling procedures. *(Equivalent to Stat. 231.)*

260. *Instructional Media and Technology.* I, II, S. 3 hr. The development of competencies in the use and construction of visual material and the technology for its utilization with various instructional procedures. Emphasis on actual production and laboratory experience.

269. *Behavioral Technology for Education.* I, II, S. 3 hr. PR: Ed. P. 105 recommended. Behavioral science applied to instructional systems. Complex systems; feedback loops; measuring relevant variables, collecting data. Applying schedules of reinforcement. Effective stimulus control for students, teachers, and administrators. Relationship between system and institution. Behavioral ethics.

Health Education

The following service courses are offered. Teacher certification in health education is not available at the undergraduate level.

Health Education (Hl. Ed.)

70. *The Individual and His Health.* II, S. 3 hr. Examines personal and health related problems in terms of information, services, and action as they relate to attainment and maintenance of individual health.

71. *Health in the Community.* I, S. 3 hr. Develops an understanding of the organization, structure, and function of official, voluntary, and professional community health components in terms of their protecting and maintaining the health of the individual and community.

101. *Elementary School Health Program.* I, II, S. 2 hr. PR: Ed. P. 105. The organization, educational aspects, and personnel relationships involved in school health services, healthful school living, and health education. *(Required for teacher certification in all teacher education programs in College of Human Resources and Education.)*

102. *Secondary School Health Program.* I, II, S. 2 hr. PR: Ed. P. 105. The organization, educational aspects, and personnel relationships involved in school health services, healthful school living, and health education. *(Required for teacher certification in all teacher education programs in College of Human Resources and Education.)*

Reading

At the undergraduate level, reading is primarily a service area to students in early childhood education, elementary education, secondary education, and special education. There are no specializations which an undergraduate can pursue.

Reading (Rdng.)

221. *Developmental Reading.* I, II, S. 3 hr. PR: Consent. Fundamentals of reading instruction. Emphasizes classroom organization and teaching techniques. *(Course will not be offered in Summer, 1979-80.)*

222. *Reading in the Content Areas.* I, II. 2 hr. Skills and strategies needed by content area teachers to reinforce the reading skills necessary for the effective learning of secondary students in the content areas. *(Course will not be offered in Summer, 1979-80.)*

240. *Corrective Language Arts Techniques.* I, II. 3 hr. PR: Rdng. 221. Fundamentals of informal language arts diagnosis and corrective classroom language arts instruction. A practicum for the utilization of informal diagnosis and corrective techniques. *(Course will not be offered in Summer, 1979-80.)*

283. *Special Workshop in Reading.* I, II, S. 1-6 hr. For elementary and secondary students in preservice education programs, as well as elementary and secondary teachers in inservice education.

Family Resources

Family Resources prepares students who are interested in obtaining undergraduate professional preparation in the broad field of home economics. The courses offered provide opportunity to study the environment of man, particularly his food, clothing and shelter, and the relationship of man to the environment. The focus is on human interaction and its consequences within the framework of the social institution of the family.

Preparation for the following career opportunities are possible by enrollment in the Department of Family Resources:

- Child development, nursery education, early childhood education, family life education, child welfare, family service occupations, and other community service fields.
- Management and effective use of family financial and human resources.
- Design and use of dwellings, interior design, and design and use of products, furnishings, and equipment for the home.
- Textile and fiber industry, fashion, and fashion merchandising.
- Human nutrition, nutrition education, food service.
- Teaching vocational home economics in grades seven through twelve.
- Community involvement with social agencies, extension, journalism, business and general home economics.

- Large industrial organizations whose major products are food.
- Dietetics.

The need to educate competent and informed citizens and family members has never been more urgent. Family Resources provides not only lectures but also a variety of laboratory experiences and selected field experiences to help students accomplish the goals of their educational ventures. Home Economics has the longest tradition of any field for interest in the education of competent and informed consumers and family members.

Students have a choice of eight program emphases leading toward a degree in home economics in the Department of Family Resources: Child development, early childhood education, dietetics, food science, home economics education, community involvement, interior design, and textiles and clothing. Certification is offered in the Home Economics Education emphasis (7-12) and certification can be obtained in early childhood education in cooperation with the Department of Curriculum and Instruction.

The degree of Bachelor of Science in Family Resources is granted with a minimum total of 129 hours, including a minimum of 58 upper-division hours.

The 129 hours includes Fam. R. 1 — Introduction to Family Resources — which is required of all freshman students in the first semester.

Requirements for Degree

Students have the choice of eight programs toward a degree in home economics: social science emphasis, interior design emphasis, textiles and clothing emphasis, dietetics emphasis, home economics education (secondary), early childhood education or general emphasis. Certification is offered in home economics education (7-12). The degree of Bachelor of Science is granted following completion of a minimum total of 128 hours, including a minimum of 58 upper-division hours.

Where written consent is required for courses offered by Family Resources it may be given only by the instructor or the chairman of the program area.

Minimum Hours in Family Resources	36-45
Total Hours in Other Areas	65-80
Electives	0-12

Required Courses

I. University Core Curriculum	*Hr.*
English Composition	6
Physical Education	2
University Core Groups A, B, and C	36
Total	44

II. Family Resources Professional Core	
1. Child Development and Family Relations 144	3
2. Textiles and Clothing 22 *or* 121	3
3. Nutrition 71 *or* 175	3
4. Home Management and Family Economics 161 *or* 165	3
5. Housing and Design 31	3
6. Family Resources 1	1
Total	16

III. Programs

a. Child Development and Family Relations Emphasis
Child Development

1. Restricted electives in Family Resources 14
2. Electives in Family Resources 7-19
3. General requirements 17
4. Restricted general electives 10
5. General electives 9-21

Total 69

b. Interior Design Emphasis

1. Additional required courses in Art, Marketing, Business, Journalism, and Speech Communication 30
2. Additional required courses in Housing and Design and Textiles and Clothing 33
3. Restricted electives 6

Total 69

c. Textiles and Clothing Emphasis

1. Required courses in Family Resources 18
2. Restricted electives in Family Resources 3-15
3. Required general courses 15
4. Restricted general electives 12
5. General electives 9-21

Total 69

d. Home Economics Education and Community Involvement (Teacher Certification) (7-12)

Students wishing a vocational teaching certificate and degree must take specified courses in the University Core Curriculum and at least 9 hours in each of the five subject-matter areas in Family Resources. *(See Programs for Secondary School Teachers under Education.)*

(Community Involvement)
Students wishing to major in Community Involvement with Social agencies, Extension, General Home Economics, and Business must take the University Core Curriculum, Family Resources core, and recommended electives to support area chosen for emphasis.

1. Family Resources Core 19
2. Restricted electives in Family Resources 24
3. Required Emphasis courses 30
4. General electives 0-9
5. Practicum 3-12

Total 76

e. Coordinated Undergraduate Dietetic Program

The Coordinated Undergraduate Dietetic Program is jointly sponsored by the Department of Family Resources and University Hospital. This program offers diverse learning opportunities through academic courses in various divisions of the University and the Medical Center, and clinical experiences in hospitals and community agencies.

After the successful completion of the four-year program the student is awarded the Bachelor of Science (B.S.) degree with a major in dietetics from the College of Human Resources and Education. Clinical experience during the period of study enables the graduate to become a member of the American Dietetic Association without an additional internship period and to be eligible for the Registration Examination.

The student enters the program at the beginning of the junior year.

To qualify for application a candidate must have completed prescribed courses, with at least a 2.5 overall grade-point average — 2.25 in science courses and 3.0 in nutrition and foods courses.

Final acceptance in the Coordinated Undergraduate Dietetic Program is subject to approval by the Admission Committee. An interview with the committee is required. *Enrollment is limited and priority will be given to West Virginia residents.*

Courses of Instruction in Family Resources

Child Development; Family Relations (CD&FR)

141. *Child Development I.* I and II. 3 hr. PR: Psych. 1, or Ed. P. 105, or consent. Theories of human development; emotional, social, and cognitive. Contemporary and traditional theories. Laboratory experience observing pre-primary centers.

142. *Child Development II.* I, II. 3 hr. PR: Psych. 1 or Ed. P. 105 or consent. Physical, psychological, and social factors affecting behavior. Observation and participation in University Nursery School.

144. *Introduction to Marriage and the Family.* I, II. 3 hr. Relevant historical influences, mate selection, changing marriage legislation, interplay of social roles in family relations, and problems of adjustment.

145. *Infant Development.* I, II. 3 hr. Developmental characteristics and issues during prenatal period and first eighteen months with implications for guidance and care.

244. *Family and Individual in the Community.* I, S. 3 hr. PR: One course in the family, or sociology/anthropology, or consent. Social psychological analysis of the individual in the family and in other social systems. Study of role relationships, community processes, and attitudes and values as they affect behavior of the individual.

245. *Family Development.* II, S. 3 hr. PR: CD&FR 144 or consent. Family developments in cross-cultural and historical perspectives. The contemporary family with special attention to social class differences and use of life cycle and developmental task concepts as analytic tools.

246. *Adolescent Development.* II. 3 hr. PR: CD&FR 141, 142. Adolescent in contemporary American culture, including normative physical, social, and personality development; relationships within various typical social settings (e.g., family, school, community, peer group).

247. *Parenting.* I, S. 3 hr. Definition of parental needs required for parenting. Explanation of types and results of parenting. Causes of child abuse and neglect — generation to generation and situational.

284. *Special Topics in Child Development.* I, S. 1-4 hr. per sem. PR: Written consent.

288. *Special Topics in Family Relations.* II, S. 1-4 hr. per sem. PR: Written consent.

Family Resources (FR)

1. *Introduction to Family Resources.* I, II. 1 hr. Exploration of career possibilities in the six major professional emphasis areas of family resources to enable students to make best possible class selections.

282. *Seminar in Clothing or Textiles.* I, II, S. 1-4 hr. per sem.; max. credit, 9 hr. PR: Written consent. Significant contemporary issues in clothing or textiles.

283. *Seminar in Housing and Design.* I, II, S. 1-4 hr. per sem.; max. credit, 9 hr. PR: Written consent; 12 hr. Hou. & D. courses. Significant contemporary issues in housing or design.

285. *Seminar in Food and/or Institution Administration.* I, II, S. 1-4 hr. per sem.; max. credit, 9 hr. PR: Written consent. Significant contemporary issues in foods and/or institution administration.

286. *Seminar in Home Management or Family Economics.* I, II, S. 1-4 hr. per sem.; max. credit, 9 hr. PR: Written consent. Significant contemporary issues in home management or family economics.

287. *Seminar in Nutrition.* I, II, S. 1-4 hr. per sem.; max. credit, 9 hr. PR: Written consent. Significant contemporary issues in nutrition.

Foods; Institution Administration (FIA)

55. *Food Principles and Practices.* I, II. 3 hr. PR: 8 hr. laboratory science or consent. Basic principles of food science. Emphasis on theoretical and practical aspects of the subject.

151. *Meal Management.* I, II. 3 hr. PR: FIA 55 or consent. Management of time, energy, money, and nutrients in planning and preparing meals within the family setting.

153. *Food Systems Management I.* I. 4 hr. PR: FIA 55, 151. Study of basic concepts, and application of basic principles in quantity food and equipment procurement, processing and service. Standardized procedures, specifications, and bid buying. Clinical experience correlated with theory.

154. *Food Systems Management II.* II. 3 hr. PR: FIA 153 and consent. Advanced clinical experience. Continuation of FIA 153, to develop some expertise in management of food service systems. Emphasis on design, organization structure and operation, and cost control.

158. *Food Systems Management III.* II. 3 hr. PR: FIA 153; FIA 154 corequisite; or consent. Organization and management of food service, including field trips and project.

257. *Food Systems Management IV.* I. 3 hr. PR: FIA 154 and 158. Clinical experience in food systems accounting, cost control and employee management. Includes administrative experience, employee evaluation, counseling and training.

258. *Food Systems Management V.* II. 6 hr. PR: FIA 257 or consent. Experience under supervision in planning, production, cost control, and employee management in an institution. Selection of setting and type of experience determined by needs of students.

355. *Experimental Foods.* II. 3 hr. (Lec. and Lab.) PR: FIA 55, Chem. 131 or consent. Factors involved in food processing under various conditions.

Home Economics Education (H.E.Ed.)

175. *Methods of Teaching Home Economics.* I, II. 3 hr. To be taken the semester or year before student teaching. Planning, implementing, and evaluating teaching-learning experiences in a supportive learning environment.

278. *Vocational Home Economics.* I, II. 3 hr. PR: Senior standing or consent. Develops an understanding of federal vocational legislation to enable an individual develop program proposals and implement programs in vocational education.

Home Management; Family Economics (HM&FE)

160. *Communication of Consumer Information.* I, II. 3 hr. *(Open to all University students.)* Introductory experiences to develop public communication skills through live and mediated presentations that meet the informational needs of consumers.

161. *Family Economics.* I, II. 3 hr. Management of family's money resources. Consideration of economic problems, planned spending and saving, and the consumer's role.

165. *Management in Family Living.* I, II. 3 hr. *(Open to all University students.)* Personally meaningful examination of the management process as it contributes to the development and effective use of human and non-human resources in the achievement of personal satisfaction in a changing world.

166. *Home Management: Residence Laboratory.* I, II. 1-3 hr. PR: HM&FE 165. Residence laboratory in home management principles and practices.

167. *Household Equipment.* I, II. 3 hr. *(Open to all University students.)* A consumer approach to evaluating portable and major household equipment with a focus on concern for: energy efficiency, safety, task performance, ecological impact, and use and care.

261. *Consumer Economics.* II. 3 hr. PR: Econ. 51 or HM&FE 161, or consent. Understanding the consumer's role in our economy. Study of research methods and techniques used to identify, understand, and solve consumer problems.

262. *Introduction to Homemaker Rehabilitation.* II. 3 hr. PR: Consent. A comprehensive coverage of the historical development, philosophy, legislation, community resources, research and professional literature provides a base of knowledge needed by the student to enter the field of homemaker rehabilitation.

Housing and Design (Hou. & D.)

31. *Introduction to Design.* I, II. 3 hr. Survey of the varied areas of design with an emphasis on analyzing and evaluating the aesthetic and functional qualities of each.

32. *Interior Design Graphics I.* II. 3 hr. Various presentation media and techniques used to provide communication skills such as drafting, rendering, perspective drawing, and layout organization for professional graphic presentation.

33. *Housing Design.* I, II. 3 hr. PR: Hou. & D. 31 or consent. Housing and home planning. Selection, arrangement, and use of interior and exterior space for activities carried on, in, and around the home.

34. *Interior Design Graphics II.* I. 3 hr. PR: Hou. & D. 32. Study and application of color theory and techniques for use in graphic presentations. Special emphasis on the aesthetic and practical aspects of interior design.

35. *Housing and Design.* II, S. 3 hr. PR: Hou. & D. 31 or consent. A practical course in which the student becomes familiar with the fundamentals of interior design through work with floor plans, furniture selection and arrangements.

133. *Interior Design.* I, II. 3 hr. PR: Hou. & D. 34. Study and application of the functional aspects of interior design through problem solving situations and extensive presentation work.

137. *Professional Practices for Interior Designers.* II. 3 hr. PR: Hou. & D. 133. The relationships between the management/marketing functions and the design process. A problem solving approach to all the activities which contribute to the completion of an interior design installation.

233. *Decorative Arts I.* I. 3 hr. PR: 9 hr. Hou. & D. courses. The decorative arts — antiquity to American periods.

234. *Decorative Arts II.* II. 3 hr. PR: Hou. & D. 233. The decorative arts — American periods to present.

235. *Contemporary Interior Design.* I. 3 hr. PR: Hou. & D. 233, 234. Study of the history of interiors, 1900-present.

238. *Portfolio Design.* I, II, S. 3 hr. PR: Senior standing. Development and preparation of a portfolio for interior design and N.C.I.D.A. qualification examination and placement.

239. *Interior Design Field Experience.* I, II, S. 3-9 hr. *(May be repeated to 9 hr.)* PR: Written consent, senior standing. Opportunity to learn and work within a professional environment with practicing designers.

Nutrition (Nutrn.)

71. *Introduction to Human Nutrition.* I, II. 3 hr. Nutrient structure, metabolism, integrated function and their importance to human well-being during all stages of the life cycle. Current concerns and those of special interest to college students in meeting nutrient needs.

175. *Food and People.* I. 3 hr. Significance of food to man and the ecology of food-behavior seen through historical, cultural, economic, and physiological perspectives.

179. *Introduction to Dietetics.* I. 1 hr. PR: Admission in Coordinated Undergraduate Dietetic Program. Introduction to philosophy, goals, role expectations, sequencing of courses and competencies expected. Emphasis is on enabling the student to develop a clear understanding of the professional development expected and the implied responsibilities.

270. *Nutrition Education.* I. 2 hr. PR: Nutrn. 71, 3 hr. in educational psychology and consent. Problems and methods in nutrition education at all levels of society, and with various types of individuals and groups.

271. *Human Nutrition.* I. 3 hr. PR: Nutrn. 71, physiology. Co-requisite: Biochemistry. Role of food nutrients in physiological and biochemical processes of the body; nutritional needs of healthy individuals under ordinary conditions.

272. *Community Nutrition I.* II. 2-3 hr. PR: Nutrn. 71 or consent. Beginning planning for community nutrition for individuals and families at various stages of the life cycle. Roles of concerned agencies and professional groups. Clinical experience in community facilities for the third credit-hour is optional.

273. *Community Nutrition II.* II. 3 hr. PR: Nutrn. 71, Nutrn. 272 or consent. Advanced course in public health nutrition. Includes nutrition programs and factors in development of nutrition policy at the national and international levels.

275. *Clinical Nutrition I.* II. 3 hr. PR: Physiology, Nutrn. 271. General aspects of nutritional care of the patient. Role of the clinical dietitian on health team. Basic methods and clinical experience of current concepts to problems of dietary management in dealing with diseases and stress.

276. *Clinical Nutrition II.* I. 4 hr. PR: Nutrn. 271, 275. Adaptations of normal diet for more complex diseases whose prevention or treatment is largely influenced by diet. Clinical experience with patient care related to the condition will be concurrent with the didactic material.

277. *Clinical Nutrition III.* II. 6 hr. PR: Nutrn. 271, 275, 276. Complex dietary treatment of disorders involving several biological systems. Effects of hormonal and biochemical changes. Complete responsibility for dietary care of assigned patients.

278. *Dietetic Technical Writing and Evaluation.* I. 3 hr. PR: Stat. 101 or 311 and consent. Foods, nutrition, and dietetics information resources. Evaluation and interpretation of foods and nutrition data. Critical evaluation of various types of publications in the discipline and technical writing. Nutrient evaluation methods.

279. *Dietetics As a Profession.* II. 1 hr. PR: Consent. Professional role of the nutritionist in modern society, dealing with problems involving ethics, attitudes, and values; case study approach.

Textiles and Clothing (Tx. & Cl.)

22. *Principles of Clothing Construction.* I, II. 3 hr. Basic principles of clothing construction including pattern alteration and fitting.

27. *Introductory Textiles.* I, II. 3 hr. Traditional background information and new developments in textiles. Special emphasis on development of raw materials into finished consumer goods.

121. *Clothing for the Family.* I, II. 3 hr. Clothing in relation to social, psychological, and economic factors, including a study of the clothing industry, trends, and cultural significance. Field trip included.

123. *Costume Design.* I. 3 hr. PR: Tx. & Cl. 22, 27. Figure and fashion drawing. Designing for individuals of various types and ages. Some history of costume included.

127. *Consumer Textiles.* II. 3 hr. PR: Tx. & Cl. 27. Discussion and examination of household textile products. Review of textile legislation and marketing strategies related to consumer protection and satisfaction.

224. *Flat Pattern Design.* I, II. 3 hr. PR: Tx. & Cl. 22, 27, 123 or consent. Opportunity for creative expression and for understanding of pattern design through flat pattern. Costumes designed and constructed by the student.

225. *Tailoring.* I, II. 3 hr. PR: Tx. & Cl. 22, 27, 224. Tailoring suits and coats. Emphasis on professional techniques, advanced fitting, and construction of garments.

226. *Advanced Fashion Design.* II. 3 hr. PR: Tx. & Cl. 224 or consent. Art principles and fashion terminology explored to increase the ability to analyze costume designs. Examination of different sources of design inspiration. Techniques of drawing from a live fashion model and various media for costume design presentation.

227. *Advanced Textiles.* I, II. 3 hr. PR: Tx. & Cl. 27, 127. Comparative characteristics of all textile fibers are presented. Physical and chemical properties are explained with reference to fiber morphology and/or manufacturing processes.

Special Education

The Department of Special Education undergraduate program in the area of the mentally retarded is a teacher preparation program. Its major goals are to train students to become highly competent teachers of the mentally retarded and to provide multiple opportunities for the understanding of new and innovative methodological techniques. The program is offered as a subject specialization in combination with the programs for Elementary School Teachers, Grades 1 through 6, or the program for Secondary School Teachers, Grades 7 through 12.

West Virginia urgently needs trained personnel in all phases of education of handicapped children and youth. State legislation has mandated the counties to provide services for the handicapped school-aged population of the state.

PROGRAM FOR TEACHING THE MENTALLY RETARDED

(Secondary Students Only)

128 Hours Required for Graduation.

General Academic Requirements	Hr.
Humanities	19
Engl. 1, 2 — Composition and Rhetoric	6
Literature elective	3
L. Sci. 203 — Literature for Children	3
Art 3 — Materials and Procedures	3
Music 41 — Music As an Art and Science	2
Music 42 — Music Materials and Procedures	2
Social Studies	12
Hist. 1 or 2 — Western Civilization	3
Three courses from the following: S. Sci. 1 or 2; Soc. & A. 1, 5, 7; Econ. 51, 52; Pol. S. 1, 2; Geog. 7, 8, 109; Psych. 1; Hist. 1, 2, 52, 53, 153	9
Science and Mathematics	14
P. Sci. 1 or 2 — Introductory General Course	4
Biol. 1 or 2 — General Biology	4
Math. 33, 34 — Introductory Mathematics for Teachers	6
Health and Physical Education	6
Hl. Ed. 101 — School Health Program	2
P.E. 41 — Movement Education and Rhythm	1
P.E. 42 — Elementary Sports Skills	1
P.E. 43 — Physical Education for Elementary Teachers	2
Teaching Specialization — Mentally Retarded	15
Sp. Ed. 250 — Survey of Exceptional Children and Adults	3
Sp. Ed. 255 — Introduction to Mental Retardation	3
Sp. Ed. 260 — Curriculum and Methods for Special Education	3
Sp. Ed. 281 — Developmental Language for the Mentally Retarded	3
SPA 250 — Survey of Oral Communication Disorders	3
Suggested Specializations or Electives	14
Specializations are available for English, Foreign Languages, Physical Education K-12, School Librarian K-12, Social Studies 7-12 and 7-9; Biology, Chemistry, General Science, Physics, Speech Communication.	
Take the following if you choose one of the above specializations:	
C&I 104 — Principles of Teaching in the Secondary School	4
C&I 124, 134, 144, or 154 — Teaching Specific Subject in Secondary School	3
Professional Education	38
C&I 7 — Introduction to Education	2
Ed. P. 103 — Human Development	3
Ed. P. 105 — Learning	3
C&I 120 — Elementary-Early Childhood Language Arts	3
Pre-Student Teaching Block	12
C&I 100 — Elementary-Early Childhood General Methods	3
C&I 130 — Elementary-Early Childhood Mathematics	2
C&I 140 — Elementary-Early Childhood Science	2
C&I 150 — Elementary-Early Childhood Social Studies	2
Rdng. 240 — Corrective Language Arts Instruction	3
Student Teaching Semester	15
C&I 187 — Student Teaching — Elementary	6
C&I 280 — Workshop Problems — Student Teaching	3
Sp. Ed. 280 — Student Teaching — Special Education	6

Special Education (Sp. Ed.)

250. *Survey of Exceptional Children and Adults.* I, II, S. 3 hr. PR: Consent. Introduction to all areas of exceptionality. Definition, psychological and educational characteristics, and social and vocational adjustment.

255. *Introduction to Mental Retardation.* I, II, S. 3 hr. PR: Consent. Historical, etiological, social, educational, and vocational aspects of mental retardation.

260. *Curriculum and Methods for Special Education.* I, II, S. 3 hr. PR: Sp. Ed. 250, 255 and/or consent. Organization of instruction, adaptation of teaching methods in several curricula areas and construction of materials.

262. *Curriculum and Methods for the Trainable Mentally Retarded.* 3 hr. PR: Sp. Ed. 250, 255 and/or consent. Special problems of curriculum development for the trainable child and adult and development of original construction of curricula materials.

265. *Industrial Arts in Special Education.* 3 hr. Experimentation with industrial arts and crafts suitable for instruction in special education classes. Discussion of factors involved in selection and manipulation of such media as leather, plastics, ceramics, wood, and metal. *(Course will not be offered in 1979-80.)*

271. *Curriculum, Materials, and Methods for Mentally Gifted.* 3 hr. History and philosophy, identification, curriculum, materials and methods.

280. *Student Teaching Clinical Experience in Special Education.* I, II, S. 1-6 hr. PR: Consent. Student teaching with the mentally retarded.

281. *Special Problems and Workshop in Special Education.* I, II, S. 2-4 hr. PR: Consent. To take care of credits for special workshops and short intensive unit course on methods, supervision, and other topics.

Speech Pathology and Audiology

The Department of Speech Pathology and Audiology (SPA) is committed to the basic preparation of students interested in graduate work leading to a career in Speech Pathology and/or Audiology.

The emphasis of pre-professional undergraduate training in Speech Pathology and Audiology is placed on broad education in basic speech and hearing sciences, anatomy and physiology of the speech and hearing mechanisms, normal development and behavior in the areas of speech, hearing, and language.

Graduates may prepare for careers by entering a graduate program at WVU or in other comparable programs for specialization in either speech pathology or audiology.

Upon completion of the master's degree the graduate will quality for certification by the American Speech and Hearing Association and by the West Virginia Board of Education.

General Requirements

(B.S. in Speech Pathology and Audiology)

1. Fulfill the University Core Curriculum requirements.

2. Present a total of 128, including 58 upper-division hours, 8 hours of general biology, 3 hours of general psychology, and 15 hours in related areas.

3. Complete a minimum of 53 hours of SPA academic courses.

4. For continuation toward a degree, the student must maintain an overall grade-point average of 2.25, and an average in the major area of 2.5 or better af-

ter completing 9 hours of SPA courses, as well as exhibit the personal and professional qualities predictive of success in the profession.

5. A minimum number of clock hours in clinical practicum will be required in the senior year.

SUGGESTED DISTRIBUTION OF COURSES FOR BACHELOR OF SCIENCE DEGREE IN SPEECH PATHOLOGY AND AUDIOLOGY

First Year	Second Year
Courses to satisfy Core Curriculum	Continuation of Core courses
Biol. 1 and 2	SPA 50, 152, 153, 154
Psych. 1	
SPA 281 (Speech Improvement)	
Third Year	**Fourth Year**
SPA 156, 182 or 183, 241, 254, 257	SPA 220, 223, 251, 252, 253, 282, 283
Electives in psychology, child development, linguistics	SPA 281 (Language Disorders in Children) Electives

Speech Pathology and Audiology (SPA)

50. *Introduction to Speech and Hearing.* I, II. 3 hr. Introduction to the profession of speech pathology and audiology, with emphasis on the role identification of health professionals. Normal speech production and language development.

80. *Speech Improvement: Theory and Performance.* I, II. 3 hr. Designed for improvement of the student's speech based upon theory and demonstrated performance of voice and diction skills and public-speaking skills for effective communication in a variety of speaking situations.

152. *Basic Speech and Hearing Science.* I. 3 hr. Application of the physical and social sciences to an understanding of the role of speech production and the acoustics of sound in human communication.

153. *Phonetics.* II. 3 hr. PR: SPA 50 or consent. Standard speech sounds of the English language. Use of phonetic symbols for recording speech sounds. Classification systems presented, with emphasis on distinctive feature analysis.

154. *Anatomy of the Speech and Hearing Mechanism.* II. 3 hr. Anatomical and physiological study of the vocal mechanisms and the ear.

156. *Articulation.* II. 3 hr. PR: SPA 50. Characteristics of normal articulation development and production. Nature and etiology of articulation disorders presented. Diagnostic procedures and general goals of therapy.

182. *Introduction to Speech Practice.* I, II, S. 1-3 hr. PR: Consent. Supervised assisting of speech diagnosis and therapy, including data keeping, preparation of clinical materials employed in therapy, observation of direct therapy, and written evaluations of observed sessions.

183. *Introduction to Audiology Practice.* I, II, S. 1-3 hr. PR: Consent. Supervised assisting of hearing diagnosis and therapy, including data keeping, preparation of clinical materials employed in diagnosis and therapy, observation of direct testing and therapy, and written evaluations of observed sessions.

210. *Manual Communication.* I, II. 3 hr. PR: Consent. Development of skills needed to communicate in sign language. The manual alphabet, basic number concepts, and the basic vocabulary of traditional American signs.

220. *Audiological Assessment.* I, II. 4 hr. PR: Consent. Physics of acoustic signal production; introduction to basic audiometric techniques and interpretation.

222. *Hearing Conservation.* S. 2 hr. PR: SPA 220 or consent. Identification audiometry for infants, pre-school and school-age children; hearing conservation in industry.

223. *Aural Rehabilitation.* II. 3 hr. PR: SPA 220 or consent. Rehabilitative approaches to management in the auditorially handicapped individual. Medical, audiological, and social aspects of rehabilitation. Procedures of speech reading and auditory training.

241. *Introduction: Speech and Hearing Practicum.* I. 2 hr. PR: SPA 50 or consent. Routine clinical and administrative procedures in speech pathology and audiology, emphasizing observation, report writing, record keeping, equipment demonstration, and test administration, scoring, and interpretation.

250. *Speech-Language-Hearing: Development-Disorders.* I, II, S. 3 hr. (Non-Majors.) PR: Consent. Discussion of normal processes and disorders of speech, language, and hearing in children and adults. Orientation course for students and teachers in early childhood, elementary, and secondary education, language arts specialists, psychologists, and rehabilitation specialists.

251. *Cleft Palate and Voice Disorders.* II. 3 hr. PR: SPA 50 or consent. Normal vocal production and embryological development of the face and palate. Nature and etiology of disorders of cleft palate and voice, diagnosis, and general goals of therapy.

252. *Stuttering.* I. 3 hr. PR: SPA 50. Development of normal fluency versus non-fluency examined in addition to the nature, etiology, theories, classification, and prognostic indicators of stuttering. General formal and informal assessment, treatment, and counseling procedures.

253. *Cerebral Palsy and Aphasia.* I. 3 hr. PR: SPA 50 or consent. Speech and language disorders related to cerebral injury, with emphasis on nature and etiology of cerebral palsy and aphasia. Diagnosis and general goals of therapy.

254. *Language Acquisition and Behavior.* I. 3 hr. Normal processes involved in the acquisition of language, including the development of phonological, semantic, and syntactical systems. Application of these processes to the diagnosis and treatment of language disorders.

257. *Public School Clinical Programs.* II. 3 hr. PR: SPA 50 or consent. Organization and structure of clinical programs in public school setting. Discussion of state and federal regulation, case selection, scheduling, program planning, and other administrative matters.

263. *Preschool Deaf Child.* I, II. 3 hr. PR: Consent. Importance of early detection and education, language development of congenitally deaf child, and parents' role in early childhood education.

281. *Special Topics.* I, II, S. 1-6 hr. per sem.; (Max. credit, 6 hr.). PR: Consent. Independent study in speech pathology, audiology, and speech and hearing sciences.

282. *Clinical Practice in Speech.* I, II, S. 1-6 hr. PR: Consent. Supervised diagnosis and therapy of speech disorders. (May be taken for a maximum of 3 hours per semester for undergraduate or graduate credit.)

283. *Clinical Practice in Audiology.* I, II, S. 1-6 hr. PR: Consent. Supervised diagnosis and therapy of hearing disorders. (May be taken for a maximum of 3 hours per semester for undergraduate or graduate credit.)

Technology Education

No students are being accepted in the undergraduate technology education program. An extensive curriculum project has been undertaken to establish a more modern and relevant curriculum model of teacher education in technology education.

Perley Isaac Reed School of Journalism

The Perley Isaac Reed School of Journalism, one of the six oldest in the United States (established in 1939), offers appropriate education to students who will become responsible communicators.

Many of the more than 1,500 graduates of the School of Journalism are using their broad education and training by covering news events throughout the world for Associated Press, United Press International, and other news media; by managing major accounts in such advertising agencies as J. Walter Thompson and Carl Byoir and Associates in New York City; and by serving in public relations positions with corporations and other institutions. They are newspaper reporters, broadcasters, university professors, businessmen, army officers, school principals, and homemakers.

The study of journalism — once limited to vocational training of newspaper reporters — now includes the many ways in which a man communicates, with emphasis on ethics and responsibility in the broad study of mass communication and society. Such an education must include the study of literature, economics, political science, psychology, sociology and anthropology, the natural sciences, and history.

A journalism education involves more than learning how to write and edit news stories, to broadcast documentaries, or to develop creative advertisements and public relations campaigns. It involves study of the substantive issues that need to be communicated, as well as those which have already occurred.

Once a student grasps the fundamentals of the liberal arts, the student must seek more than the ability to communicate. The student must also acquire ethical awareness because their future work will have impact far beyond that of most occupations. A successful public relations practitioner or advertising executive must know where ethical advocacy of a product ends and hucksterism begins. The photographer-journalist and the editor must know where the presentation of fact ends and fabrication begins. It is in this realm, as well as that of substantive course work, that a faculty of high quality plays a major role.

When students enroll in the School of Journalism, they are guided by a faculty of fourteen full-time and four part-time professors who represent more than 150 years of cumulative journalistic experience. It is a faculty that represents the diversity of the school itself. The backgrounds and education of the teaching staff include professional experience with newspapers, the wire services, radio and television, public relations firms, and advertising agencies.

The School of Journalism works with students in writing courses to get their work published. Their articles frequently appear in the *Daily Athenaeum*, award-winning student newspaper at WVU; the *Morgantown Dominion-Post; Take One*, the school's laboratory newspaper; and in state and national publications. Students have been named to Sears Congressional Fellowships in the nation's capital for one semester, to Magazine Publishers Association summer fellowships, and to legislative internships in the state capital. In addition, the School of Journalism maintains a working relationship with the *Daily Athenaeum*. Students serve as reporters and editors for the paper as an extracurricular activity. The School of Journalism also operates a newsroom to give stu-

dents practical writing and editing experience, and one of the products is *Take One.*

Advanced students in photojournalism may receive practical experience as photographers for the *Daily Athenaeum*, as local stringers for Associated Press, and as part-time photographers for the WVU Office of Publications.

Advertising students find opportunities for practical experience by selling advertisements and servicing accounts for the *Daily Athenaeum* and other campus publications, as well as by handling the paper's other business matters.

Students directing their studies toward production have an opportunity to become involved in both letterpress and offset projects in typography and production laboratories. Those wishing to get involved in newspaper production have ample opportunity to become members of the *Daily Athenaeum* production staff; and they learn how to run the latest cold-type production equipment, as well as newspaper paste-up.

Public relations students generate and execute projects aimed at identifying and solving communications bottlenecks between local and statewide organizations and their publics. They also serve internships during the summer and throughout the school year. Public relations and news-editorial majors also participate in intern programs in the WVU Sports Information Office.

Because students write, edit, sell advertising, and even do the typesetting and page paste-up for the *Daily Athenaeum*, any facet of journalistic life can be experienced if a student so desires.

Students in the broadcast journalism sequence gain basic knowledge and entry-level skills in radio-television news in the introductory courses of this curriculum. They gather, write, edit and present the news, and use such learning aids as audio and video tape (both portable and studio), and film. They may build on that foundation both in the more advanced courses and through internships and similar work-and-study opportunities at the University's television station (WWVU-TV), Office of Publications, Sports Information Office, the WVU Extension Service, as well as with commercial television and radio stations.

The School of Journalism also operates a summer program that places superior students in jobs with newspapers, magazines, radio stations, television stations, businesses and industries for about ten weeks.

The School of Journalism is in newly renovated Martin Hall, WVU's oldest building which was constructed in 1870. More than $1.8 million was spent on renovating, furnishing, and equipping the building. While the interior was completely modernized, the appearance of the exterior was maintained; even the new annex on the west end of the building was constructed so that it would blend with the old.

The laboratories include electric typewriters, a video display terminal system, modern radio and television equipment, light tables, a photocomposition unit with more than 100 typefaces, photoenlargers, cameras and equipment for independent study. In addition, there is a reading room with current newspapers, magazines, professional journals, and reference works.

Faculty

Guy H. Stewart, Ph.D. (U. Ill.), *Dean and Professor of Journalism.*
Paul A. Atkins, M.A. (U. Va.), *Professor of Journalism.*
Donovan H. Bond, M.A. (WVU), *Professor of Journalism.*
Charles F. Cremer, Ph.D. (U. Iowa), *Professor of Journalism.*
Harry W. Elwood, M.S. (Northwestern U.), *Associate Professor of Journalism.*

Harry W. Ernst, M.S.J. (Northwestern U.), *Assistant Professor of Journalism.*
Dennis R. Godfrey, M.A. (WVU), *Adjunct Assistant Professor of Journalism.*
Frank M. Kearns, B.A. (WVU), *Claude Worthington Benedum Professor of Journalism.*
Hunter P. McCartney, Ph.D. (U. Penn.), *Professor of Journalism.*
David L. Martinson, Ph.D. (U. Minn.), *Assistant Professor of Journalism.*
Robert M. Ours, Ph.D. (C. Wm. & Mary), *Associate Professor of Journalism.*
P. Michael Ryan, Ph.D. (Sou. Ill. U.), *Associate Professor of Journalism.*
William O. Seymour, M.A. (E. Tex. St. U.), *Associate Professor of Journalism.*
William R. Summers, Jr., M.A. (U. Mo.), *Professor of Journalism.*
Patricia C. Truitt, M.A. (Calif. St. C.), *Assistant Professor of Journalism.*
C. Gregory Van Camp, M.S.J. (WVU), *Associate Professor of Journalism.*
Donald F. Williams, Ph.D. (U. N. Colo.), *Associate Professor of Journalism.*
Pamela D. Yagle, M.S.J. (WVU), *Instructor in Journalism.*

Standing Committees

Academic Standards: W. R. Summers, Jr. *(Chairman)*, F. M. Kearns, G. H. Stewart (ex officio), and student representative.

Executive: Dean G. H. Stewart *(Chairman)*, P. A. Atkins, C. F. Cremer, H. P. McCartney, and W. R. Summers, Jr.

Graduate Studies: P. M. Ryan *(Chairman)*, D. H. Bond, C. F. Cremer, H. P. McCartney, D. F. Williams, Dean G. H. Stewart (ex officio), and student representatives.

Library Acquisitions: D. H. Bond *(Chairman)* and Dean G. H. Stewart (ex officio).

Off-Campus Education: D. L. Martinson *(Chairman)*, H. W. Elwood, W. O. Seymour, D. W. Williams, P. D. Yagle, Dean G. H. Stewart (ex officio), and student representatives.

Placement: D. H. Bond *(Chairman)*, F. M. Kearns, and student representatives.

Planning: R. M. Ours *(Chairman)*, W. R. Summers, Jr., P. C. Truitt, Dean G. H. Stewart (ex officio), and student representatives.

Scholarships: H. P. McCartney *(Chairman)*, P. A. Atkins, Dean G. H. Stewart (ex officio), and student representatives.

Accreditation

The School of Journalism is accredited by the American Council on Education for Journalism (ACEJ) for the Broadcast Journalism sequence. ACEJ approval is held by seventy-four colleges and universities in the United States.

The quality of the School's program has also been recognized by memberships in the American Association of Schools and Departments of Journalism and the American Society of Journalism School Administrators.

Professional Relations

A close and continuing relationship is maintained with the West Virginia mass media through the West Virginia Press Association, the West Virginia Press Women, the West Virginia Broadcasters Association, and an adjunct to the Press Association — the West Virginia Public Relations Associates. These groups have provided scholarships and financial support to the School.

In turn, the School of Journalism provides services to the professionals. Regional advertising seminars have been conducted for newspaper publishers and retail merchants, and workshops on newswriting have been conducted for stringer-correspondents of weekly newspapers. The School has provided science writing symposia and seminars on Appalachia, future of transportation, and interpretive vs. advocacy reporting for newsmen; it also has worked with the Public Relations Associates of the Press Association in establishing semi-

nars. The School has assisted journalism teachers by sponsoring summer workshops and by working with their publications staffs during the school year.

Typewriting

Before or soon after entering WVU, a student planning to major in journalism should learn the touch system of typing. From the beginning, all students in writing courses are expected to submit copy in neat, typewritten form.

Admission

To be admitted to the School of Journalism as a journalism major, a student must meet these requirements:

1. Must have successfully completed 58 hours (excluding F's) with an overall grade-point average of 2.0, with at least a 2.0 average in journalism courses.
2. Must have a 2.5 overall grade-point average if the student has already attempted 75 or more hours.
3. Must file for admission with the head of the sequence in which one wishes to study; application must be approved by the dean.
4. Must agree to complete at least 45 hours in the School of Journalism.
5. Must complete Journalism 18, or equivalent, with at least a C grade before admission as a journalism major.
6. Must pass the school's Diagnostic English Test.
7. Achieve at least a 2.0 in English 1 and 2. (*See* Proficiency in English, below.)

Complete information concerning WVU admission, registration, fees and expenses, and regulations may be obtained in Part 2 of the *Undergraduate Catalog*.

Proficiency in English

Competence in writing is emphasized. A student who plans to major in journalism must achieve at least a 2.0 average or higher in English 1 and 2. If a student has English 1 or 2 waived because of competence demonstrated on American College Testing Program (ACT), or other criteria, that student must substitute another English course in his or her program for each waiver. In addition, students must pass the Diagnostic English Test (DET) administered in Journalism 18. If a student does not pass the DET in the first week of the semester, the student *must* take a writing skills laboratory in addition to the regular Journalism 18 laboratory. The writing skills laboratory will be programmed to prepare the student to pass the DET at the end of the semester. If a student fails the examination the second time, one more opportunity will be provided in the succeeding semester. A student who plans to major in journalism may not enroll in additional journalism courses before passing the DET.

Journalism Organizations

Several organizations affiliated with the School of Journalism provide the opportunity for honor and recognition as well as for fellowship and education. They are:

AAF, professional advertising fraternity.
Alpha Delta Sigma, scholastic advertising honorary.
IABC, professional society in organizational communication.

Kappa Tau Alpha, national scholastic honorary for students with exceptional academic records in journalism.

Public Relations Student Society of America, national public relations professional organization.

The Society of Professional Journalists, Sigma Delta Chi, professional society for news and broadcasting majors.

Job Placement

The School of Journalism assists its graduates in finding desirable positions. It acts as a placement clearinghouse for current and past graduates, and it publishes a placement supplement that is distributed to all alumni and state media.

Representatives of newspapers, magazines, public relations, broadcasting, and advertising visit the campus to interview seniors, and they frequently request the School of Journalism to provide applicants for their openings.

Bachelor of Science in Journalism

A candidate who has satisfied all general requirements of the University and has met the requirements of the School of Journalism will be recommended for the degree of Bachelor of Science in Journalism (B.S.J.), provided the combined numbers of credits acquired as a pre-journalism student and as a regularly enrolled journalism major totals no fewer than 128. *This total will not count non-translated courses from other colleges, any course repeated more than one time (such as Music 102), or Mathematics 2.* While WVU frequently accepts all junior college credits, the School of Journalism follows the American Council on Education for Journalism recommendation of accepting only 12 journalism credits from such institutions.

In line with the national accreditation council and the school's philosophy on the ratio of professional journalism courses to courses in liberal arts, a degree candidate will take approximately one-fourth of the total hours in journalism. The minimum number of journalism hours will be 30, and the maximum number ordinarily will be 33. No fewer than 40 hours shall be obtained in courses numbered between 100 and 400. A student must complete at least 45 hours after admission to the School of Journalism.

A student may pursue another degree concurrently, but the candidate must plan the program with the deans of the two colleges involved. Also, a student with one bachelor's degree may seek a bachelor's degree in journalism. The student must plan the program with the dean.

A student within 12 hours of graduation in the last semester may elect to take one or more courses for graduate credit. However, the student must consult with the adviser and petition the Graduate School.

The student, in the penultimate semester, will be expected to provide for School of Journalism records a small head-and-shoulders photo and information about future employment preferences.

Scholastic Requirements

To be eligible for graduation, a student must earn a minimum cumulative grade-point average of 2.0; concurrently the journalism average and the average in the student's minor field must be at least 2.0. All courses in the minor field are counted toward the minimum 2.0 grade-point average.

No student will be recommended for the degree unless it has been shown to the satisfaction of the faculty that the student possesses abilities and qualifications that give promise of doing adequate work in professional journalism.

Independent Study/Waivers

The journalism faculty encourages students to take courses by examination and through independent study, when the student's background and the nature of the courses lend themselves to such arrangements. The method of examination can be appropriate when students have in some way other than by class attendance learned the course content. Independent study may be undertaken in some courses with the consent and supervision of the professor. In unusual cases, a student may receive the Dean's permission to waive a course.

Probation/Full-Time Load

A student on probation shall not take more than 15 hours of course work in a semester, and the Committee on Academic Standards may require that the student not take more than 12 hours. Also, no student may enroll for more than 18 hours in a single semester without petitioning the student's adviser.

Withdrawal from Class or University

All students enrolled in journalism courses may withdraw from a course through the first five weeks with a grade of W. After that date, a student may withdraw only after approval of the Committee on Academic Standards, and then the student will be awarded a grade of W or WU.

Journalism majors who withdraw from the University after the ninth week of a semester will be automatically suspended from the School of Journalism for a minimum of one semester (not including a summer term). If a late withdrawal results from illness, the student must present a written excuse from a physician at the time of withdrawal to avoid automatic suspension.

Minor Field

To meet the requirements of a minor, a student must earn at least 15 hours in a subject other than journalism with no more than 3 hours in courses numbered under 100. Courses at 100 level or higher, even when they can be taken more than once, will be counted only one time. For students pursuing two minors simultaneously, the requirements in each area are at least 12 hours, of which no more than 3 hours can be numbered under 100. A student taking a single minor in the College of Business and Economics cannot elect courses from more than two divisions. A student should consult the adviser about a minor.

Students from other major fields of study are permitted to minor in journalism.

Internship Credit

A number of internship opportunities for credit are available in the summer; to a lesser extent such credit is available during the academic year. All students interested in internship credit must apply for it *in advance* and establish a "contract" with the head of a sequence. This "contract" is essentially an

agreement that spells out the terms under which credit will be given. It describes the kind of learning experience that will be involved, including assignments, reports, type of supervision, and the evaluation by a supervisor on the job plus a member of the school's faculty.

Minor/Special Emphasis

Because all journalism majors need to know more and more about economics, they are encouraged to consider a minor in this field. A recommended program has been developed jointly by the journalism and economics faculties. The minor:

JOURNALISM — ECONOMICS

Courses for Minor in Economics for Journalism Majors (15 hours)

Required:	*Hr.*
Economics 51 — The Economic Systems	3
Economics 52 — Contemporary Economic Issues	3
Electives:	
Economics 110 — Comparative Economic Systems	3
Economics 211 — Micro-Economic Analysis	3
Economics 212 — Macro-Economic Analysis	3
Economics 216 — History of Economic Thought	3
Economics 241 — Public Finance	3
Economics 245 — Government and Business	3
Economics 255 — Regional Economics	3
Economics 260 — Manpower Economics	3
Economics 262 — Collective Bargaining	3
Economics 270 — Growth of the American Economy	3

Course for Minor in Journalism for Economics Majors (12 Hours)

Required:	*Hr.*
Journalism 18 — News Writing	3
Electives:	
Journalism 19 — Editing and Make-up	3
Journalism 111 — Introduction to Public Relations	3
Journalism 113 — Principles of Advertising	3
Journalism 118 — Reporting and Advanced Editing	3
Journalism 122 — Public Relations for Profit Making Organizations	2
Journalism 182 — Broadcast Journalism	3

Other Journalism courses that may interest Economics majors include: Introduction to Broadcasting, Advertising Media Analysis, Media Management, Writing for Magazines, and Public Relations Case Studies.

Advertising Curriculum

The advertising curriculum is designed to prepare students for careers in the creation, sales, management, and production of advertising.

Journ. 50, 113, 203, and 239 are the basic advertising courses in the sequence. Everything else in advertising instruction is founded on these courses.

Students develop a specialization in advertising in the junior and senior years. The specialization areas are: Copy (Journ. 114, 215, 216); Media (Journ. 203, 204); and Graphics (Journ. 110, 210).

The minor field is subject to approval of the adviser. Some approved minors are marketing (highly recommended), economics, management, finance,

business law, psychology, and speech communication. Fifteen hours, with no more than 3 hours in courses numbered under 100, are required for the minor. A second minor is optional.

Persons who are interested in practical application of advertising production problems should consider part-time employment in the offset production plant of the *Daily Athenaeum*, in addition to electing Journ. 210.

Students in advertising prepare for careers with advertising agencies, company advertising departments, retail advertising, promotion, and the media.

First Year

Journalism 1	3
Journalism 50	3
English 1	3
English 2	3
Science	8
Humanities 1/2/10/11/191	6
Political Science 2	3
Physical Education	2
Library Science 1	1
Psychology 1	3

Second Year

Journalism 18	3
Journalism 113	3
English elective	3
Philosophy	6
Economics 51/52 or 54/55	6
History 52/53	6
Mathematics 3	3
Sociology/Anthropology	3
Statistics 101	3

Third Year

Journalism 203	3
Journalism 239	3
Journalism electives*	5-6
Minor Field	6
Electives	3
English elective	3
Political Science 120	3
Psychology 101	3
Marketing 111	3

Fourth Year

Journalism 299	3
Journalism electives*	5-6
Minor Field	6
Electives (Theatre, Art, Music, Speech Communication, Sociology/Anthropology)	10-12

*Advertising majors select one specialty area.

Broadcast Journalism Curriculum

The broadcast journalism curriculum is supported by a complete teleproduction facility including television and radio studios and associated control room, video and audio tape assembly and editing area, and a film editing facility. However, the focus and the thrust of the instruction in the broadcast journalism curriculum stresses basic news writing, editorial judgment, and the principles as well as the practices of radio and television news.

Supported by a broad liberal arts background, the curriculum stresses an integration of news equipment familiarization, journalism principles and practices, legal aspects, journalism ethics, and professional standards and norms. Such a preparation helps students not only to develop their own communicative skills but also to develop an appreciation of radio, television, cable, and newsfilm as communicative and journalistic arts. Additionally, these studies challenge the student's ability to evaluate and criticize broadcast media functions, performance, responsibilities, and influence in society.

Professional staff members of WVU's Office of Radio, Television, and Motion Pictures, Radio-TV Extension Service, and Radio-TV News Service hold joint appointments and teach in some broadcast journalism courses. The Office of Radio, TV and Motion Pictures operates the University-owned educational television station, WWVU-TV.

Students seeking a career in the news and information area in broadcasting should pursue this curriculum. The student's minor field must be approved by the adviser.

This sequence is accredited by the American Council on Education for Journalism.

First Year

Journalism 1	3
Journalism 117	3
English 1	3
English 2	3
Physical Education	2
Core C	8
Humanities 1/2/10/11/191	6
Political Science 2	3
Library Science 1	1

Second Year

Journalism 18	3
English electives	6
History 52/53	6
Political Science 120	3
Science/Mathematics	4
Electives	3
Minor field	6

Third Year

Journalism 182	3
Journalism 183	3
Journalism 189	3
Economics 51/52 or 54/55	6
Minor field	3
Electives	12-14

Fourth Year

Journalism electives	6-9
Journalism 284	3
Journalism 299	3
Electives	12-14
Minor Field	6

Journalism electives must be taken from the following list unless substitutions are approved by the adviser: Journ. 19, 111, 113, 120, 128, 227, 228, 285, 286.

Journalism Education

The School of Journalism has been working for a number of years with journalism teachers and administrators in West Virginia schools to improve journalism instruction and school publications. An even greater effort has been made over the past decade through regional high school workshops, summer workshops for students and teachers on the WVU campus, and individual consultation with schools by members of the School of Journalism faculty.

One of the outgrowths of this cooperative effort has been a new certification program in Journalism. The student who finishes the curriculum outlined here and receives the degree of Bachelor of Science in Journalism will qualify for a first-class professional certificate in West Virginia with teaching fields in Journalism and English (or other fields of student's choice), Grades 7-12.

While English is selected as the second field by most journalism majors, one may name social studies, speech communication, art, or another field. However, one must also consult the General Studies section of the certification program for other requirements.

If a student elects journalism as a second field, the student must take Journalism 1, 18, 19, 120, 225, and 227 for a total of 18 hours plus 3 hours of journalism electives. Students in teacher certification fields do not have minors.

A student must attain an overall grade-point average of 2.25 before being admitted to student teaching, and the grade-point average must be at least 2.0 in any field chosen for certification. Furthermore, the student must not plan to enroll for any courses outside of the teaching bloc in the semester during which the student plans to do student teaching; the student may need to teach in a community away from Morgantown.

First Year

Journalism 1 3
English 1 3
English 2 3
Science 8-9
Humanities 1 3
Humanities 2 3
Physical Education 2
History 52/53 6
Curriculum and Instruction 7 2
Library Science 1 1

Second Year

Journalism 18 3
Journalism 19 3
Mathematics 3
Social Science, Multidisciplinary Studies, Sociology and Anthropology 3
English 21* 3
English 22 3
English 24 3
English 25 3
Speech Communication 11 and 12, 13 or 14, *or* Theatre 50 3
Art 30 *or* Music 30 3
Educational Psychology 105 3
Educational Psychology 103 3

*A student may select a second teaching field in place of English and, therefore, may require different courses to satisfy that field.

Third Year

Journalism 113 3
Journalism 225 3
Journalism electives 3-6
Social Science, MDS, or S/A 3
Curriculum & Instruction 104 4
Reading 222 2
Curriculum & Instruction 124 3
English 111 3
English 125 3
English 108 3
English electives 6
Health Education 102 2
Linguistics 1 3

Fourth Year

Journalism 120 3
Journalism 227 3
Journalism 299 3
Curriculum & Instruction 188 12
Curriculum & Instruction 280 3
Journalism electives 3-6
English 188, 225, 241, 280, 286, 288, 291 3
English 294 3
English 293 1
English 295 3
Curriculum & Instruction 224 2
Curriculum & Instruction 225 2

Journalism electives must be taken from the following list unless substitutions are approved by the adviser. Journalism electives: Journ. 50, 110, 111, 118, 141, 182, 220, 228, 230.

News/Editorial Curriculum

This curriculum is devoted to teaching fact-gathering, news and feature writing, and the various skills of editing. The sequence stemmed from the first courses offered in journalism at WVU.

Most news-editorial graduates have found employment with newspapers, magazines, and other publications or with the international press associations. This, in part, is because they have received excellent preparation for such careers in print media by working on the staff of the *Daily Athenaeum* and other newspapers. Other graduates, however, have gone into broadcasting or public relations or hold writing and editing positions in the professions, scientific fields, business, industry, and government.

News-editorial students most frequently minor in political science, history, or English. But it is becoming more common for them to select such areas as sociology and anthropology, psychology, speech communication, and economics.

First Year

Journalism 1	3
Journalism 18	3
English 1	3
English 2	3
Humanities 1/2/10/11/191	6
Science	8
Elective	3
Political Science 2	3
Physical Education	2
Library Science 1	1

Second Year

Journalism 19	3
Journalism 120	3
History 52/53	6
Economics 51/52 or 54/55	6
English elective	3
Core C	4
Political Science 120	3
Electives	3-6

Third Year

Journalism 118	3
Journalism 128 or 227	3
Minor (upper division)	6
Electives	18
English elective	3

Fourth Year

Journalism 228	3
Journalism 220 or 230	3
Journalism 299	3
Minor (upper division)	6
Electives	10-13
Journalism electives	2-7

Journalism electives must be taken from the following list unless substitutions are approved by the adviser: Journ. 108, 110, 111, 113, 117, 130, 141, 182, 183.

Public Relations Curriculum

A relatively new profession within the sphere of communications, public relations offers practitioners challenging opportunities to explain organizations — industrial, educational, military, charitable — to their publics. The profession has had its major advance since World War II. WVU graduates are finding ready acceptance of their services.

Public relations offers rewarding careers to men and women. Several fields — transportation, entertainment, convention arrangements, and company newspapers — seem to prefer the feminine touch. Husband and wife PR teams are not uncommon, so the woman who wishes to follow a dual career — homemaker and part-time or full-time professional work — finds public relations a flexible activity to fit her uncertain schedule.

The curriculum is organized to provide the student a comprehensive familiarity with all aspects of communications — written, spoken, and image. The student learns to gather, interpret, and present information in the varied media of communications — newspapers, radio, TV, and specialized forms (brochures, reports, slides, speeches, etc.). The student learns principles of advertising, photography, typography and layout, programming, and organizational and management functions.

A public relations major is encouraged to select a minor that will provide a deeper understanding of personal and interpersonal relationships, e.g., political science, psychology, sociology and anthropology, or a minor that will enhance the projected area of practice, business and economics, education, or science.

First Year	
Journalism 1	3
English 1	3
English 2	3
Physical Education	2
Psychology 1	3
Humanities 1/2/10/11/191	3
Science*	8
Library Science 1	1
Political Science 2	3
Elective	3

Second Year	
Journalism 18	3
Journalism 19	3
Economics 51/52 or 54/55	6
English	3
History 52/53	6
Mathematics/Science	3
Philosophy 1 or 10	3
Speech Communication 11/14	3
Minor electives	3

*Two science courses must be taken in sequence, e.g., Biol. 1 and 2.

Third Year	
Journalism 111	3
Journalism 121	3
Journalism 122/123	2
English	3
Psychology 101	3
Statistics 101	3
Political Science 120	3
Minor electives	6
Electives	6
Journalism electives	3-6

Fourth Year	
Journalism 221/222	3
Journalism 299	3
Journalism electives	1-4
Engineering 111	3
Marketing 111	3
Minor electives	6
Electives	7-10
Journalism elective	3
Journalism electives	4-6

Journalism electives must be taken from the following list unless substitutions are approved by the adviser. Journalism electives: Journ. 110, 113, 117, 118, 120, 220, 228.

Courses of Instruction in Journalism (Journ.)

1. *Introduction to Mass Communications.* I, II, S. 3 hr. *(Recommended for all University students.)* Mass communicator's role in developing political, social, and economic fabrics of a democratic society. Organization and function of newspapers, magazines, broadcast stations, and other principal media, including role of advertising.

18. *News Writing.* I, II, S. 3 hr. PR: Journ. 1 or consent. Essentials of fact-gathering; writing news and features; ethics and responsibilities of news reporting. Typing ability required. Also, an honors section and labs are available to students who have good writing ability. A permit is required for the honors section. Two lec. and a 2-hr. lab-demonstration period. To pass the course one must also pass the Diagnostic English Test.

19. *Copy Editing and Make-Up.* I, II, S. 3 hr. PR: Journ. 18. Combination lecture laboratory twice a week for two hours, plus lab experience on the laboratory paper. Copy editing, headline writing, handling of wire copy, and make-up.

50. *Visual Communication.* I, II. 3 hr. PR: Journ. 18. Graphic arts as a communication medium. Discussion of photography and typography with emphasis on basic techniques and aesthetics.

108. *The Community Newspaper.* I. 2 hr. *(Open to all University students.)* Fundamental problems and techniques in operation of community newspapers.

110. *Typography and Printing Processes.* I, II. 3 hr. Fundamentals of print production, including design and composition procedures for major printing processes, discussion and application of typographic aesthetics. *(Students must acquire tools for the course: cost about $5.00.)* One lec., 2 hr. lab.

111. *Introduction to Public Relations.* I, II, S. 3 hr. *(Open to all University students; required in the public relations curriculum.)* Introduces the student to communica-

tion between an organization and its publics. Definition and historical development, opportunities and challenges, techniques and management of public relations are included.

113. *Principles of Advertising.* I, II, S. 3 hr. *(Open to all University students.)* Advertising in the American economic system for national and retail advertisers. Study of individual advertising and media, copy and layout problems, appeals, research production, schedules, federal and state laws affecting advertising, and ethics. Practical laboratory work in writing and layout of advertising. Two lec. One 2-hr. lab.

114. *Retail Advertising.* I, II. 2 hr. PR: Journ. 50 and 113, or consent. Planning, preparation of newspaper advertising campaign for a daily newspaper, including supplementary assignments in radio copy, direct mail, outdoor advertising, and sales promotion. 2 hr. lec.

117. *Introduction to Broadcasting.* I, II, S. 3 hr. Survey of the broadcasting industry from the perspective of broadcast journalism, including historical development, federal regulation, industry codes, professional responsibilities, broadcasting research, and contemporary developments including cablevision.

118. *Advanced Reporting and Editing.* I, II. 3 hr. PR: Journ. 18 and 19. Development of a student's ability to cover and write spot news, public affairs and interpretative articles, and investigative stories. Lab work includes assignment and editing of stories for daily newspapers.

120. *Introduction to Photography.* I, II, S. 3 hr. Basic techniques of film developing and printing. Students required to purchase their own film, enlarging paper, and have access to a camera. *(Film and enlarging paper cost approximately $40.00 per semester.)*

121. *Public Relations Research and Theory.* I, II. 3 hr. PR: Stat. 101 and Journ. 111. Explores various theories of public opinion formation; applies methods of measuring and analyzing public opinion for application to public relations programs for changing, maintaining or crystallizing public opinion for socially acceptable causes.

122. *Public Relations for Profit-Making Organizations.* I, II. 2 hr. PR: Journ. 111. How industries, utilities, banks, and other profit-making organizations explain their policies and procedures to their publics.

123. *Public Relations for Non-Profit Organizations.* II. 2 hr. PR: Journ. 121. Educational, religious, charitable, governmental, and health organizations are the major focus of the course, with particular emphasis on their need to gain public acceptance, understanding, and financial support.

128. *Reporting of Public Affairs.* II. 3 hr. PR: Journ. 18 or consent. Reporting local, state, and federal government activities and other public affairs. Visits to public agencies and training in spot news and depth reporting in public affairs.

130. *Advanced Photography.* I. 3 hr. PR: Journ. 120 or equiv., or consent. Designed to equip students to serve all communication media including magazines, newspapers, television. A high level of competence is assumed at the outset. Course requirements include a portfolio (general or around a specific theme) and an essay on the work of a recognized (contemporary or historical) photographer.

141. *Advanced Journalism Problems.* I, II, S. 1-6 hr. For juniors and seniors. Intensive, independent study; to be approved by the Dean.

182. *Broadcast Journalism I.* I, II. 3 hr. PR: Journ. 18 and consent. Lecture-laboratory course oriented to radio news. Gathering, writing, editing, and presenting news for radio. Outside taping and studio taping, broadcasts; monitoring local and network newscasts. Emphasis on writing news scripts.

183. *Broadcast Journalism II.* I, II. 3 hr. PR: Journ. 182 and consent. Continuation of Journ. 182, with course content oriented to television news, including electronic news gathering (ENG).

189. *Newsfilm in Television.* I, II. 3 hr. PR: Journalism major and consent. Planning, shooting, editing, and scripting of newsfilm for television newscasts.

203. *Advertising Media Analysis.* I, II. 3 hr. PR: Journ. 113 or consent. Buying, estimating, scheduling of print and broadcast media. Preparation of media rationale for national campaigns based on research and statistical analysis and computerized data. Determination of advertising allocations; sales representation; promotion.

204. *Media Management.* I, II. 3 hr. PR: Journ. 113, 114, and 203 or consent. Planning of advertising appropriations in national and international print and broadcast media. Client, agency, and media responsibilities. Evaluation of advertising. Presentation.

210. *Graphic Design.* II. 3 hr. PR: Journ. 110. Design layouts for print media. Includes buying, supervising, and scheduling of art, typography, and print material. 2 hr. lec., 2 hr. lab.

215. *Advanced Print Copywriting.* II. 2 hr. PR: Journ. 50, 113, 114, or consent. Copy concepts, copy platforms, techniques, and strategies. Preparation of copy and media for a national campaign. 2 hr. lec., 2 hr. lab.

216. *Broadcast Copywriting and Studio Production.* II. 2 hr. PR: Journ. 50, 113, and 215 or consent. Writing and production of radio and television commercials. Includes preparation of scripts, storyboards, selection of talent, and studio direction. 2 hr. lec., 2 hr. lab.

220. *Writing for Magazines.* I, II. 3 hr. PR: Upper-division or graduate standing; Journ. 18 or equivalent preparation in grammar, punctuation, and spelling. Professional approach: magazine analysis, query letters, writing, rewriting; submitting manuscripts for publication.

221. *Public Relations Interning.* I, II. 3 hr. PR: Journ. 122 or 123. *(Open only to junior, senior, and graduate public relations majors.)* Student learns through on-the-job training and from reports of those who have on-the-job experience. Course structured along a public relations agency organization and operations.

222. *Public Relations Case Studies.* II. 3 hr. PR: Journ. 122 or 123. Seminar based on in-depth studies of public relations programs developed and applied in support of our institutions. Primary emphasis on successful campaigns, but unsuccessful efforts also will be examined for cause of failure.

225. *High School Publications Advising.* II. (Alternate Years.) 3 hr. PR: Journ. 18, 19, 113. *(For students seeking Journalism certification.)* Emphasizes writing styles, newspaper/yearbook layout, rights and responsibilities of the teacher, students, and school system. Enrollees will construct instructional portfolios based on research and classroom discussion concepts. *(Course will not be offered in 1980-81.)*

227. *History of Journalism.* I, II, S. 3 hr. PR: Hist. 52 and 53 or consent. *(Open to all University students.)* Impact of American press on the nation; development of today's media from seventeenth century England and in the American colonies; great names in journalism; freedom of the press and its current implications.

228. *Law of the News Media.* II. 3 hr. *(For seniors and graduate students.)* The law as it affects the mass media. Considered are such areas as libel, privacy, public records, criminal pre-trial publicity, freedom of information, obscenity.

230. *Editorial and Critical Writing.* I. 3 hr. *(Open to all University students.)* The student will analyze and write commentaries; study typical editorial pages and the ethics governing editorial page content; become familiar with libel, privacy, contempt, and other problems.

231. *Color Photography.* II. 3 hr. The theory of color slides and prints, including slide development, as applied to multi-media presentations for advertising and public relations. *(Supplies will cost $50.00-$70.00.)*

239. *Seminar in Advertising Management Problems.* II. 2 hr. PR: Senior standing and major or minor in advertising. Application of the study of advertising research, law and theory in the preparation of a national advertising campaign. Aspects of the campaign to cover marketing, research, creative, media, sales promotion, and presentation.

251. *Direct Mail Advertising.* I. 3 hr. PR: Journ. 113 and 114 or consent. Mailing marketing, and creation of direct mail letters, brochures, involvement pieces, and reply cards. Postal regulations, direct mail law, and printing procedures. Two lec., one lab.

284. *Public Affairs Reporting by Television.* I, II. 3 hr. PR: Journ. 183 and consent. Preparation and presentation of public issues via television. Methods of topic selection, research, organization of ideas and script development, alternate formats, ethical and legal constraints.

285. *Special Topics in Broadcast Journalism.* I, II. 1-3 hr. *(Repeatable up to 6 hr.)* PR: Consent. Directed investigation of selected topics in broadcast journalism.

299. *Contemporary Media Issues and Ethics.* I, II. 3 hr. *(Required of all senior journalism majors.)* In-depth study of contemporary media issues such as right of access to media, morality in news and advertising, new FTC and FCC regulations, media responsibility to society, social responsibility of media professionals. Individual research papers on issues with ethical considerations.

300. *Introduction to Graduate Studies.* I. 1 hr. *(Required of all graduate journalism students.)* Non-credit course designed to orient students to graduate study.

302. *Seminar in Communications Theory.* I. 3 hr. PR: Studies in human behavior. Communications theory drawing heavily on social psychology and sociology/ anthropology. Philosophy of science. Theory as scientific knowledge. Characteristics of theory. Begin learning how to draw on experts, to apply theory. Begin thesis.

304. *Mass Media and Society.* I. 3 hr. *(Required of all graduate journalism students.)* Study of mass media and their role in and influence on society; includes analysis of the social, political and economic determinants of media content and character.

312. *Fund-Raising and Foundation Management.* I. 3-6 hr. *(Open to graduate journalism students and to seniors with 3.0; consent.)* Seminar. Studies in fund-raising, alumni relations, and foundation management.

315. *Seminar in Journalism Education.* I, S. 1-3 hr. Journalism education problems. Each student does an individual research project planned to provide for the student's professional development as a journalism teacher. Emphasis on secondary school problems.

337. *Eighteenth Century Journalism: American.* I. 3 hr. Role of Colonial journals in reducing regionalism and in forging a nation; in-depth study of selected journals; patterns of interrelationships among publications; the press during the Revolutionary years.

338. *Eighteenth Century Journalism: European.* II. 3 hr. Examination of British periodicals and their impact on political, cultural, and economic patterns of the century; study of selected journals; contributions and characteristics of Continental periodicals and their forerunners.

339. *Seminar in Advanced Advertising Management Problems.* II. 3 hr. Recently developed ideas and techniques in advertising, advertising research, and media management.

341. *Special Topics.* I, II, S. 1-6 hr.

343. *International Communications.* I. 3 hr. International news gathering and dissemination — including wire services, broadcast satellites, and political barriers — will be examined, particularly as these factors affect a free exchange of information within the world community. Efforts by the United Nations to encourage news exchange and to lower news barriers will be a major case examination.

344. *Seminar in the Foreign Press.* II. 3 hr. Studies in legal and communications problems of the international flow of news and opinion; international press codes; communications media of major countries.

380. *Thesis.* I, II, S. 2-6 hr.

390. *Professional Project.* I, II, S. 2-6 hr.

School of Medicine

The curriculum for the degree of Doctor of Medicine (M.D.) is described in the *WVU Medical Center Catalog.*

Medical Technology

The undergraduate program in Medical Technology is under the administration of the School of Medicine. Students are admitted into the program leading to a bachelor of science degree after the completion of two years of premedical technology in an accredited college or university. The WVU medical technology program is accredited by the Committee on Allied Health Education and Accreditation of the American Medical Association. Graduates are eligible for certification by the Board of Registry of the American Society of Clinical Pathologists (ASCP) and by the National Certification Agency for Medical Laboratory Personnel (NCA).

The undergraduate curriculum includes the premedical technology program, which is offered in the College of Arts and Sciences and at Potomac State College in Keyser and the medical technology program which is offered in the School of Medicine.

Courses of the first two years (premedical technology) may be taken in any institution of recognized standing that offers the courses required for admission into the medical technology program.

Since the course of study of the last two years is of a professional nature, students must be enrolled in the WVU School of Medicine for this entire period. The work of the junior year (the first year in the medical technology program) includes courses which introduce the student to the medical sciences and courses which prepare the student for the work of the senior year. During the senior year (the second year in the medical technology program) the student receives both didactic instruction and practical experience in the University Hospital laboratories.

The program's primary aim is to provide a strong undergraduate program in medical technology which leads to a Bachelor of Science degree and which provides an educational background acceptable for graduate work in the medical sciences. The purposes are: (1) to provide a program in medical technology which meets the academic standards of the University; (2) to provide medical technologists for clinical, public health, and research laboratories; (3) to provide an educational background which enables students to prepare for teaching and supervisory positions in medical technology, and (4) to provide an educational background acceptable for graduate work in the medical sciences.

A program is available for certified medical technologists who desire to complete requirements for a Bachelor of Science degree. (Further information may be obtained by contacting the WVU Medical Technology Office.)

Admission

Application for admission into the junior year (first year in the undergraduate medical technology program) should be made before the beginning of the second semester of the sophomore year in college. *Students at WVU or Potomac State College are not transferred automatically from the preprofessional*

course (first two years) to the professional course (third and fourth years). Students are selectively admitted to the program for their final two years of work.

Application forms for admission to the professional course are obtained from the office of the Assistant to the Dean of Admissions and Records, Medical Center. These forms should be completed and returned to that office no later than February 1, if the student expects to enter the succeeding first semester classes.

Admission to the third year is on the recommendation of the Admissions Committee to the Dean. A personal interview with the Committee is required. A minimum grade-point average (over-all and science) of 2.0 is required for admission.

Because of the large number of applicants and limited openings available in WVU Medical Center programs, preference in admissions is given to qualified West Virginians although outstanding nonresident applicants will be considered. Careful consideration is given to those personal qualifications which bear upon fitness of applicants for the study and practice of the profession.

Admission Requirements

Complete information concerning WVU admission, fees and costs, registration, regulations, etc. may be found in the *Undergraduate Catalog* for the College of Arts and Sciences.

(a) Admission requirements for the first year (premedical technology) are those for the College of Arts and Sciences.

(b) Admission to the third year (first year of the medical technology program) is based upon two years of college work with a total of 64 hours as follows:

English. 6 hours. (Composition and rhetoric.)

Biological Science. 8 hours. (General biology or general zoology.)

Chemistry. 15-16 hours. (Inorganic chemistry, 8 hours; quantitative analysis, 3-4 hours; organic chemistry, 4 hours.) (Transfer students are required to have a complete course in organic chemistry to include aliphatic and aromatic compounds.)

Physics. 8 hours.

Physical Education. 2 hours. (University requirements for students taking first two years in residence.)

Mathematics. 3 hours. (College algebra is minimal requirement.)

Electives to complete the required hours and to meet WVU Core Curriculum requirements.

Courses such as bacteriology, parasitology, and anatomy should not be taken until after the completion of the sophomore year. A foreign language is recommended for students who plan to do graduate work.

Degree

The degree of Bachelor of Science in Medical Technology is granted to those students who have completed the prescribed curriculum and who have been recommended for the degree by the faculty of the School of Medicine.

Curriculum and Courses

For complete information concerning curriculum and courses of instruction in Medical Technology, see the *WVU Medical Center Catalog.*

Division of Physical Therapy

The Division of Physical Therapy, under the auspices of the School of Medicine, offers the final two years of a baccalaureate program leading to a degree in physical therapy.

The first two years of study may be completed in the College of Arts and Sciences of West Virginia University, or any other accredited institution which offers courses comparable to the admission requirements of the Division of Physical Therapy. To be eligible for a degree, a student must complete the final two years of the curriculum at WVU.

Admission to the third year is based upon 62 or more credit hours of study which satisfy the University's Core Curriculum requirements and the prerequisites, or their equivalent, of the Division of Physical Therapy. *Registration in the first two years does not automatically assure the student a place in the junior class. A student will be accepted on a competitive basis and selection will be based on scholastic standing and on those personal characteristics which are desirable in physical therapists.*

The student must satisfactorily complete a three-month period of clinical internship before the awarding of the baccalaureate degree. A Certificate of Proficiency in Physical Therapy then will be awarded which entitles the graduate to seek membership in the American Physical Therapy Association and to become eligible for state licensure for the practice of physical therapy. (A physical therapist can practice professionally only after having passed the state board examination in the state where employment is desired.)

Admission to Professional Program

A personal interview with the Admissions Committee is required. Only those students who have at least a 2.6 grade-point average and a 2.75 science average (on a 4.0 scale) and who will have completed all the prerequisites of the Division of Physical Therapy by the current spring semester will be interviewed. Individuals who do not meet the above requirements but who believe extenuating circumstances justify admission may petition the Admissions Committee for an interview. Reasons why the application should receive special consideration should be clearly stated in the petition. The Admissions Commitee will advise the applicant of the time and place of the interview.

Official enrollment forms are available at the office of the Assistant to Dean, Admissions and Records, Medical Center, beginning December 1 of each year. Application forms should be returned no later than March 1 in the year admission is desired.

Because of the large number of applicants and limited openings available in WVU Medical Center programs, preference in admissions is given to qualified West Virginians although outstanding nonresident applicants will be considered. Careful consideration is given to those personal qualifications which bear upon fitness of applicants for the study and practice of the profession.

Curriculum and Courses

For complete information concerning the curriculum and courses of instruction in Physical Therapy, see the *WVU Medical Center Catalog.*

Division of Military Science (ROTC) and Air Force Aerospace Studies (ROTC)

West Virginia University offers qualified applicants two- and four-year courses of instruction in Military Science (ROTC) and Air Force Aerospace Studies (ROTC). Normally, successful completion of one of these courses and degree requirements leads to a commission as a second lieutenant in the U.S. Army Reserve or the U.S. Air Force Reserve. Outstanding students may be offered regular commissions (Army only).

Equivalent credit for part or all of the four basic semesters of ROTC may be granted in accordance with existing military service regulations. This credit will be awarded on the basis of: prior active military service, high school ROTC, military school (Army ROTC at high school level), attendance at service academies, junior college senior division Army ROTC, or Civil Air Patrol training.

Deposit

Each ROTC student is required to pay a yearly deposit of $20.00 to cover any loss or damage to issued property in the student's possession. The deposit is paid to the WVU Comptroller at time of registration and is refunded, less a nominal yearly administrative and service charge, upon return of undamaged property. Cadets are permitted to keep their uniforms upon successful completion of the program.

Military Science (U.S. Army)

The Military Science program at West Virginia University is designed to provide: a reserve corps of scholars, citizens, and soldiers; graduates qualified in leadership and management skills, and prepared for public service; and men and women trained to assume responsible positions as commissioned officers in the active army, army reserve, or national guard, as well as business, government, and industry.

Whether or not the student elects to take only two years of the program while at the University, for which there is no service obligation, or remain for the full four-year program to become an officer, he or she is better prepared to make a meaningful contribution in the preservation of American ideals and national security.

Faculty

Roger D. Harms, LTC, B.G.E., *Professor of Military Science.*
Gene Dziedzic, Jr., MAJ, B.S., *Assistant Professor of Military Science.*
James A. Moore, MAJ, M.A., *Assistant Professor of Military Science.*
Roger K. Imhof, CAPT, B.S., *Assistant Professor of Military Science.*
Kenneth R. Vreeland, CAPT, B.A., *Assistant Professor of Military Science.*
Lawrence Kisner, MSG, *Senior Enlisted Instructor.*
Ronald D. Pierce, SFC, B.A., *Administrative Noncommissioned Officer.*
William H. Walters, SSG, *Supply Sergeant.*

Scholarship Program

Competitive scholarships are available for one, two, three, and four years. The government will pay for tuition, fees, and textbooks. Additionally, the scholarship student receives $100 per month, tax free, during the academic year as a subsistence allowance. Candidates for the one-, two-, and three-year scholarships must be enrolled in Military Science. *Four-year scholarship competition is for high school students only.* High school counselors have application forms or write to: Professor of Military Science, Stansbury Hall, West Virginia University, Morgantown, WV 26506.

United States Military Academy, West Point

Outstanding Army ROTC students may be recommended by the Professor of Military Science for a ROTC nomination to the United States Military Academy at West Point. The student must meet all academy entrance requirements before being eligible for nomination.

Basic Course (Freshmen and Sophomores)

The Basic Course of instruction is for freshman and sophomore students who desire to investigate the possibilities of future government service *without* committing themselves to a military service obligation. The basic course class may be added or dropped as any other course in the University. Credits earned in ROTC count toward lower-level academic requirements. Additionally, the student gains a social awareness and develops personal values important in civilian life. Uniforms are not required in the basic course.

Army ROTC — First Year

Mil. Sci. 1. 2 hr. The organization and development of the U.S. Army and ROTC from its inception to the present. The structure and role of the U.S. defense establishment with emphasis on the broad range of American civil-military relations.

Mil. Sci. 2. 2 hr. The development of American military institutions, policies, experience, and traditions in peace and war are discussed. Past wars are examined in the perspective of modern military thought.

Army ROTC — Second Year

Mil. Sci. 3. 2 hr. Introduction to basic leadership and management with emphasis on the fundamental concepts and skills required of today's citizen-soldier.

Mil. Sci. 4. 2 hr. Continued instruction in basic fundamentals of leadership and management, with emphasis on the military application of these fundamentals. Introduction to small-unit tactics and organization.

Advanced Course (Juniors-Seniors-Veterans)

Selected students may participate in Advanced ROTC. It is required of all students who have an ROTC scholarship. Successful completion of the advanced course means earning a reserve commission as a second lieutenant in one of the fourteen branches of the Army which require over 300 occupational skills.

Advanced Course Allowances

Advanced Course students without an ROTC scholarship are given the same subsistence allowance as scholarship students. This allowance provides the student with $100 per month during the academic year.

Army ROTC — Third Year

Mil. Sci. 105. 3 hr. PR: Basic course or equiv. (Equivalent credit may be granted by the WVU Dean of Admissions and Records and the Professor of Military Science on the basis of prior military service, or ROTC training other than courses in military science taken at WVU.) Examines the requirements for military training and the psychological and technical aspects of effective instruction. Additionally, the military career system and the occupational specialties options available are reviewed.

Mil. Sci. 106. 3 hr. PR: Mil. Sci. 105 or consent. Race relations/drug abuse seminars are conducted to familiarize students with the leadership techniques involved in coping with these unique social problems. Additionally, practical training is conducted in squad- and platoon-level tactics. The course is designed to prepare the student for Advanced Camp.

Advanced Summer Camp

Before a student can be commissioned, the student must attend an advanced summer camp of 6 weeks duration, between the junior and senior years. Cadets receive travel allowances and pay equal to one-half the basic pay of a second lieutenant. This year that amounted to over $500.

Army ROTC — Fourth Year

Mil. Sci. 107. 3 hr. PR: Mil. Sci. 105 and 106 or consent. Stresses the responsibilities of an officer and affords leadership experience through performance as a cadet leader. Military staff procedures, military law, and tactical military operations, which prepare the student for future service, are studied.

Mil. Sci. 108. 3 hr. PR: Mil. Sci. 107 or consent. Advanced leadership techniques, behavior patterns, and personnel management problems are discussed in seminars. The military role in United States foreign policy and world affairs is examined.

Leadership Laboratory

Freshman-Sophomore

Leadership training for freshman and sophomore students is designed to be challenging and adventurous. It provides opportunity for students to participate in action-oriented activities which develop self-confidence and self-discipline while encouraging the emerging leader. Mountain climbing, rifle marksmanship and orienteering are some of the student's choices for participation. An average of one hour a week is required.

Junior-Senior

Leadership instruction is applied by the student in a working laboratory environment. Emphasis is placed on small-unit tactics, drill and ceremonies, physical training, rifle familiarization, and preparation for Advanced Summer Camp.

Two-Year Program (Sophomore and Transfer Students)

Selected students who apply will be enrolled in a two-year program that leads to an Army commission. The two-year student will attend a six-week Basic ROTC Camp the summer between the sophomore and junior years of college. Upon successful completion of this camp he or she may enter the Advanced ROTC Program and complete the requirements for an Officer Commission during the two remaining years in school. Transfer students desiring to enter this program should contact the Professor of Military Science, Stansbury Hall, West Virginia University, Morgantown, WV 26506, before March 31 when planning on entering the University in the fall. WVU sophomores considering participation should contact the Army ROTC office early in the Spring Semester.

Airborne Training

Selected cadets may voluntarily attend Airborne training at Fort Benning, Georgia. Airborne training is three weeks in length; successful completion of the course results in the award of the airborne wings of a military parachutist.

Veterans Program

Veterans with six months or more of active military service who are rising junior students may receive college credits for the first two years of Army ROTC. They immediately enter the Advanced Course and the subsistence allowance of $100 per month does not affect the benefits they receive under the G.I. Bill.

Aerospace Studies (U.S. Air Force)

The Air Force officer education program at West Virginia University has been in existence since 1946 and is designed to provide training that will develop managerial skills and interpersonal attitudes vital to the professional Air Force officer. It is designed to qualify those college men and women for commissioning who desire to serve in the U.S. Air Force. West Virginia University has the only Air Force ROTC (AFROTC) detachment in West Virginia.

Faculty

Harry P. Snoreck, Col., M.S., *Professor.*
Edward J. Pollock, Maj., M.S., *Assistant Professor.*
Gary Brovetto, Capt., M.A., *Assistant Professor.*
Bruce L. Ullman, Capt., M.A., *Assistant Professor.*
Jerry W. McCutcheon, T.Sgt., *Noncommissioned Officer in Charge.*
Harry E. Brown, S.Sgt., *Personnel Specialist.*
Nicholas Tirotta, S.Sgt., *Administrative Specialist.*

Scholarship Program

Outstanding students from any academic discipline may apply to and be accepted by the Professor of Aerospace Studies to compete for scholarships under this program.

A large number of scholarships are available for students majoring in an engineering, scientific, or mathematical field.

For students awarded scholarships the government will pay for tuition, fees, and textbooks, as well as provide $100 monthly allowance.

Scholarships of this nature are available for two, three, and four years.

Benefits

Enrolling in Air Force Reserve Officer Training Corps (AFROTC) provides the opportunity to:

1. Earn at least 8 hours of academic credit which can be applied toward the requirements of any undergraduate major at WVU.
2. Compete for AFROTC scholarships that pay full tuition, fees, and $100 per month (tax free).
3. Receive free career counseling from full-time campus representatives.
4. Go on field trips to Air Force installations anywhere in the United States.
5. Try AFROTC during freshman and sophomore years without obligation.
6. Develop leadership and managerial skills in the various corps projects.
7. Compete for entry into the Professional Officer Course (POC) and earn an Air Force commission.
8. Travel, on a space available basis, aboard government aircraft at no cost (POC and scholarship cadets only).

Flight Instruction Program

Students qualified and selected for the pilot category (IP) will be given ground instruction and 25 hours of flight training at no cost. It is recommended that eligible students receive ground instruction through enrollment in Aerospace Engineering 170, a 3-credit, FAA-approved course of instruction. An intensive 15-hour ground instruction course for no credit is available within the Department of Aerospace Engineering for those students unable to enroll in the AE course. The ground instruction phase is normally completed during the second semester of the junior year. Flight training, conducted at Benedum Airport, Clarksburg, is normally taken by students during the first semester of their senior year. No effective credit is given for this instruction.

Distinguished AFROTC Graduate

The Professor of Aerospace Studies may designate as a Distinguished Graduate a POC member who:

1. Has a superior academic record and field training education.
2. Possesses outstanding qualities of leadership and high moral character.
3. Demonstrates leadership ability through achievement in recognized campus activities, both curricular and noncurricular, which, in conjunction with 1 and 2 above, warrants designation as "Distinguished."

Air Force Academy

The WVU President may annually nominate five outstanding AFROTC students to be enrolled in the U.S. Air Force Academy. Applications for the nomination are recommended by the Professor of Aerospace Studies to the WVU President during January of each year.

Summer Field Training

Applicants for the professional officer course must attend a summer Field Training Course before entering the junior year. Students who have completed the freshman and sophomore year in AFROTC are assigned to a 4-week training unit; however, students who did not participate as freshmen or sophomores must attend a more intensive 6-week course. The Air Force will furnish uniforms, housing, medical care, and rations in addition to giving students round-trip travel allowance and military pay. Students who successfully complete Field Training then become eligible for the professional officer course.

Curriculum

The curriculum in Air Force Aerospace Studies is divided into three distinct areas: General Military Course, Corps Training, and Professional Officer Course. In addition, each cadet must take and successfully complete a course in English composition, or its equivalent, before completing the General Military Course and must also complete a course in mathematical reasoning before graduation and commissioning.

General Military Course (GMC)

The Air Force course of study offered during the freshman and sophomore years is the General Military Course (GMC). This is composed of one class hour and one corps training hour per week. Two credit hours are allowed for each semester course successfully completed. Four semesters of the GMC is one means of admission to the POC. However, a two-year POC option is available for those students who do not complete the GMC.

GMC — First Year (AFROTC)

AF Aerospace Studies 1. 2 hr. The Air Force in the contemporary world through a study of the total force structure, strategic offensive and defensive forces, general purpose forces, aerospace support forces and separate operating agencies. (Also includes Corps Training as described below.)

AF Aerospace Studies 2. 2 hr. Continuation of AFAS 1.

GMC — Second Year

AF Aerospace Studies 3. 2 hr. The development of air power from dirigibles and balloons through the peaceful employment of U.S. air power in relief missions and civic actions programs in the late 1960's and the air war in Vietnam; leadership and managerial communicative skills are stressed by having students prepare both written and oral presentations. (Also includes Corps Training as described below.)

AF Aerospace Studies 4. 2 hr. Continuation of AFAS 3.

Corps Training

Corps Training is taken an average of one hour per week throughout the student's enrollment in AFROTC. Instruction is conducted in an organized cadet corps with a progression of experiences designed to develop each student's leadership potential. Corps Training involves a study of Air Force customs and courtesies; drill and ceremonies; career opportunities; and the life and work of an Air Force junior officer. Students develop leadership potential in a practi-

cal, supervised training laboratory, which typically includes field trips to Air Force installations throughout the U.S.

Professional Officer Course

The Professional Officer Course (POC) corresponds to the junior and senior years of a student's academic course. Enrollment in the advanced course also is open to graduate students if they have four semesters of school remaining.

The POC is designed to provide highly qualified junior officers for the U.S. Air Force. Enrollment is based on such factors as scholarship, physical qualifications, leadership, desire for flying training, and academic major. Successful completion of the advanced course qualifies the student for appointment as a second lieutenant in the U.S. Air Force.

Instruction averages three hours per week throughout the four semesters, in addition to the Corps Training hours required. Three hours of credit are allowed for each of the four semesters of work in the advanced program subsequent to acceptance by a school or college in the University.

To be eligible for enrollment into the POC, students must meet the following requirements:

1. Make application for the POC as soon as possible (usually during the sophomore year), taking into consideration the following items:
    a. Have a 2.0 cumulative grade-point average.
    b. Have two years (4 semesters) of undergraduate or graduate school remaining.
    c. Be under 30 years of age at the time of commissioning, except that pilot and navigator applicants must not be older than 26½ years when commissioned.
2. Pass the Air Force Officer Qualifying Test.
3. Pass an Air Force medical examination.
4. Be accepted by the Professor of Aerospace Studies.
5. Complete the GMC and/or Field Training (4 weeks for 4-year applicants; 6 weeks for 2-year applicants).
6. Agree to accept a commission as a second lieutenant in the USAF and serve at least four years if not on flying status, or five years after completing pilot or navigator training.
7. Enlist in the Air Force Reserve (8 years for scholarship recipients; 6 years for nonscholarship students).

POC — Third Year (AFROTC)

AF Aerospace Studies 105. 3 hr. PR: GMC or equiv. (Equivalent credit may be granted by WVU Dean of Admissions and Records and the Professor of Aerospace Studies on the basis of prior military service or ROTC training other than courses in Aerospace Studies taken at WVU.) Course focuses on military leadership, management, and the progressive development of communicative skills needed by junior officers. It emphasizes the individual as a manager in the air force. The individual motivational and behavioral processes, leadership, communication and group dynamics are covered to provide a foundation for the development of the junior officers' professional skills as an air force officer. Organizational and personal values, management of forces in change, organizational power, politics and managerial strategy and tactics are discussed within the context of the military organization. Students will make field trips, prepare individual and group presentations for the class, write reports, and participate in group discussions, seminars and conferences. (Corps training as described above.)

AF Aerospace Studies 106. 3 hr. PR: AFAS 105 or consent. Continuation of AFAS 105.

POC — Fourth Year

AF Aerospace Studies 107. 3 hr. PR: AFAS 105 and 106 or consent. The course examines military professionalism and existing patterns of civil-military relations; Analyzes the international and domestic environments affecting U.S. defense policy; examines the post-World War II development of defense strategy and the methods of managing conflict. Students will prepare individual and group presentations for the class, write reports, and participate in group discussions, seminars, and conferences. (Corps training as described above.)

AF Aerospace Studies 108. 3 hr. PR: AFAS 105, 106, 107 or consent. Continuation of AFAS 107.

College of Mineral and Energy Resources

Today's opportunities in the mineral industries have never been better. Moreover, these opportunities are very likely to grow in the future as minerals and fuels become scarcer and competing uses for land displace mineral operations, and as concerns over environmental control and conservation of resources increase. With America placing more importance on domestic sources of materials and energy, mineral engineering graduates have an opportunity to become part of one of our nation's most vital industries.

Mineral engineering brings into play a broad range of skills and activities — planning, supervising, and operating mineral extraction processes, both above and below ground. Mining engineering is the science of extracting solid fuels and minerals from the earth's crust such as coals, oil shale, precious metals, and ores of iron, copper, aluminum, and uranium. Students interested in petroleum or natural gas engineering courses in the College of Mineral and Energy Resources will cover the exploration, drilling, production, and evaluation of oil and natural gas reservoirs.

Mineral processing deals in the initial treatment of minerals as they are extracted from the earth, including extractive metallurgy, coal preparation, mineral beneficiation, and energy conversion processes. Mineral and material recycling is likely to become an area of major emphasis in future years.

Mineral and energy resource economics studies the economics of the mineral industries, commodity markets, and the economic evaluation of resources in their broadest aspects as affected by engineering technology, earth sciences, and national policy. Thus, it ties together the geology of resources, the engineering of extraction and conversion processes, and the demands of industrial societies through mineral markets and trade.

Located in the center of one of the greatest mineral producing areas of the country, the College of Mineral and Energy Resources is near industrial, mining, and petroleum and natural gas-producing areas. The college has a cooperative program with participating companies that permits students to attend WVU half the year and work for the participating company the other half. The money earned, in most cases, takes care of a student's educational expenses. Summer employment is also available. A number of the largest oil and gas companies throughout the United States provide summer employment for students enrolled in the petroleum engineering program.

Faculty

Joseph W. Leonard, M.S.E.M. (Penn St. U.), *Acting Dean.*

General Minerals Program

Kenneth K. Humphreys, P.E., C.C.E., M.S.E. (WVU), *Professor; Chairman.*
Patrick R. Esposito, Ph.D. (WVU), *Associate Professor.*

Mining Engineering

Syd S. Peng, Ph.D. (Stanford U.), *Associate Professor; Chairman.*
David J. Akers, Jr., M.S. (WVU), *Adjunct Assistant Professor.*

Donald M. Bondurant, P.E., M.S.E.M. (WVU), *Associate Professor.*
Charles T. Holland, P.E., M.S.E.M. (WVU), *Professor Emeritus.*
Jay Hilary Kelley, Ph.D. (Penn St. U.), *Professor.*
Calvin J. Konya, Ph.D. (U. Mo., Rolla), *Associate Professor (On Leave).*
Joseph W. Leonard, M.S.E.M. (Penn St. U.), *Professor.*
Joseph D. McClung, P.E., M.S.E.M. (U. Pitt.), *Associate Professor Emeritus.*
Barry G. McMillan, B.S. (WVU), *Adjunct Assistant Professor.*
Duk-Won Park, Ph.D. (U. Mo., Rolla) *Assistant Professor.*
Ernest J. Sandy, P.E., M.S.E.M. (U. Pitt.), *Associate Professor.*
Earle P. Shoub, B.S. (Brooklyn Polytech.), *Adjunct Professor.*
Y. J. Wang, P.E., Ph.D. (Penn St. U.), *Associate Professor.*

Petroleum Engineering

James A. Wasson, P.E., M.S.P.N.G. (Penn. St. U.), *Associate Professor; Chairman.*
Faleh Al-Saadoon, Ph.D. (U. Pitt.), *Associate Professor.*
Seadat Ameri, B.S.Pet.E. (WVU), *Instructor (On Leave).*
Robert W. Chase, Ph.D. (Penn. St. U.), *Adjunct Assistant Professor.*
Richard W. Laird, P.E., M.S.E.M. (WVU), *Professor (part-time).*
Herman H. Rieke, Ph.D. (U. So. Cal.), *Associate Professor; Engineering Scientist.*
Walter K. Sawyer, M.S. (WVU), *Associate Professor.*

Mineral Resource Economics

Richard T. Newcomb, Ph.D. (U. Minn.), *Professor; Chairman.*
Sidney Katell, P.E., C.C.E., B.Ch.E. (NYU), *Research Professor.*
Walter C. Labys, Ph.D. (Nottingham U., Eng.), *Associate Professor.*
William H. Miernyk, Ph.D. (Harvard U.), *Claude Worthington Benedum Professor.*

Mineral Processing Engineering

Thomas P. Meloy, Ph.D. (MIT), *Claude Worthington Benedum Professor; Acting Chairman.*
Kenneth K. Humphreys, P.E., C.C.E., M.S.E. (WVU), *Professor.*
Richard B. Muter, M.S. (WVU), *Associate Professor.*
Felicia F. Peng, Eng. (Stanford U.), *Assistant Professor.*

Coal Research Bureau

Joseph W. Leonard, P.C.A., M.S. (Penn. St. U.), *Director; Professor.*
Kenneth K. Humphreys, P.E., C.C.E., M.S.E. (WVU), *Assistant Director; Professor.*
William F. Lawrence, B.S. (Waynesburg C.), *Assistant Director; Engineering Scientist.*
Richard B. Muter, M.S. (WVU), *Assistant Director; Associate Professor; Engineering Scientist.*
David J. Akers, Jr., M.S. (WVU), *Engineering Scientist.*
J. K. Alderman, B.A. (WVU), *Coal Research Technologist.*
William H. Buttermore, B.S. (WVU), *Engineering Scientist.*
William C. Grady, B.S. (WVU), *Coal Petrographer.*
Mary Alice Hannah, B.S. (WVU), *Coal Research Technologist.*
Sidney Katell, P.E., C.C.E., B.Ch.E. (NYU), *Research Professor.*
James D. McClung, M.B.A. (WVU), *Engineering Scientist.*
Charles R. McFadden, B.S. (WVU), *Engineering Scientist.*
Barry B. McMillan, B.S. (WVU), *Engineering Scientist.*
Marilyn Maloy, B.S. (WVU), *Coal Research Technologist.*
Larry L. Nice, M.B.A. (WVU), *Engineering Scientist.*
Edward Simcoe, B.A. (WVU), *Coal Research Technologist.*
Thomas Simonyi, B.A. (Earlham C.), *Coal Research Technologist.*
John F. Slonaker, B.A. (Wash. & Jeff. C.), *Engineering Scientist.*

Mining and Industrial Extension

Thomas L. Savage, B.S. (Cornell U.), *Instructor, Program Leader.*
Joseph C. Dorton, B.S. (Concord C.), *Instructor.*
L. Bennett Ferguson, *Assistant Professor.*
Robert L. Halstead, B.S. (Morris Harvey C.), *Assistant Professor.*
James H. Kincaid, B.S. (W. Va. Tech.), *Instructor.*
Albert H. Kirchartz, (Fairmont St. C.), *Instructor.*
Duane A. Letcher, Ed.D. (WVU), *Associate Professor (On Leave).*
Peter P. Mintreas, B.S. (WVU), *Assistant Professor.*
Herman P. Sparks, M.A. (WVU), *Instructor.*
Lloyd B. Tolbert, B.S. (Concord C.), *Assistant Professor.*

ECPD Accreditation

The Engineer's Council for Professional Development (ECPD), a joint body concerned with the enhancement of the status of the engineer and the engineering profession, has been designated by the professional engineering societies as the coordinating agency for the accreditation of undergraduate engineering curricula in the United States. The mining and petroleum engineering curricula are fully accredited by the ECPD. The Mineral Processing accreditation is being sought.

Admission

For admission to the College of Mineral and Energy Resources, students must be qualified for admission to WVU and present credit for: (1) 4 units of English; (2) 2 units of algebra; (3) 1 unit of geometry; (4) ½ unit of trigonometry and an ACT score of at least 27 in mathematics. Students lacking the requirements in mathematics can apply for admission to the pre-mineral engineering curriculum.

All persons entering as first-semester freshman students must take the American College Testing Program tests (ACT) and have the scores sent to WVU. These scores are used for academic placement purposes and no other test may be substituted for it.

Complete information concerning WVU admission, registration, fees and expenses, and regulations are in Part 2 of the *Undergraduate Catalog.*

Requirements for Degrees

In order to be eligible for a bachelor's degree, any student shall be required to complete satisfactorily the number of semester hours of work as specified in the curriculum of the program leading to the degree for which the student is a candidate, plus the general requirements of physical education and English.

Professional Degrees

WVU confers the professional degrees of Engineer of Mines (E.M.) and Petroleum Engineer (Pet.E.) upon graduates of the College of Mineral and Energy Resources on the basis of practical experience and study in absentia, the presentation of a thesis, and oral final examination. To be eligible, a candidate for the professional degree must have been in active practice of the profession for at least five years since receiving the first degree, and must have been in responsible charge of important work for at least two years.

Application for registration as a candidate for a professional degree should be made not later than October 1 in the academic year in which the degree is desired. Detailed regulations and registration blanks may be obtained from the Dean of the College of Mineral and Energy Resources.

Curricula

The following engineering curricula are offered in the College of Mineral and Energy Resources:

1. A four-year curriculum leading to the degree of Bachelor of Science in Engineering of Mines.
2. A four-year curriculum leading to the degree of Bachelor of Science in Petroleum Engineering.
3. A combined science and engineering curriculum leading to the degree of Bachelor of Science and Bachelor of Science in Engineering of Mines or Bachelor of Science in Petroleum Engineering.
4. A four-year curriculum leading to the degree of Bachelor of Science in Mineral Processing Engineering.

The first two years of instruction are very similar in the programs. During this period the student is given a thorough grounding in mathematics, geology, physics, and chemistry. During the third and fourth years, the student is given instruction in the engineering sciences as well as in the professional subjects. Also, studies in the humanities are continued with the student being permitted to elect a reasonable proportion of the subjects to be studied.

The mineral resources program offers professional and general electives at both the lower- and upper-division levels to all students in the areas of mineral and energy economics, mineral resources appraisal and exploration, design of mineral process operations, and models of mineral commodity markets.

General Minerals Program

College of Mineral and Energy Resources

FIRST YEAR				SECOND YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Chem. 15	4	Chem. 16	4	Math. 17	4	Math. 18	4
Math. 15	4	Math. 16	4	Phys. 11	4	Phys. 12	4
Engl. 1	3	Engl. 2	3	M.E.M. 41	3	M.E.M. 42	3
Geol. 1	3	M. 2*	3	Geol. 151**	4	I.E. 213**	3
M. 1*	3	P.E. 2	1	Core elect.	3	Core elect.	3
P.E. 1	1	Core elect.	3				
	18		18		18		17

*M. 19 and M. 20 for Mineral Processing Engineering students in lieu of M. 1 and M. 2.

**I.E. 281 and M.P.E. 103 for Mineral Processing Engineering students in lieu of Geol. 151 and I.E. 213.

Engineering of Mines

Degree: Bachelor of Science in Engineering of Mines

Mining engineering deals with discovering, extracting, beneficiating, marketing, and utilizing minerals from the earth. The role of the mining engineer is quite diversified and there are opportunities for technical specialization in pro-

specting, development, production, beneficiating, utilization, marketing, and safety. Therefore, the mining engineer must be well trained in the fields of mining and geology and also in the principles of civil, electrical, and mechanical engineering as applied to the mining industry. With the present trend toward the use of engineers in industrial management and administrative positions, the mining engineer's training also must include economics, business, personnel management, and the various humanities.

Professional study includes geology and the engineering principles of blasting, materials handling, transportation, hoisting, water control, surface and underground systems of mining, roof control, rock mechanics, ventilation, mineral preparation, and plant design.

The mining engineering curriculum is divided into three options: underground mining, mine health and safety, and surface mining.

The underground mining option stresses ventilation practice, ground control, and mine systems design. Special consideration is given to the application of mining machinery with particular attention to power transmission and electric and hydraulic control systems.

The mine health and safety option stresses ground control, mine ventilation, and additional courses especially oriented to mine health and safety theory and practice.

The surface mining option includes courses in the procedures and systems for surface overburden removal, surface transportation, restoration, reclamation, and revegetation. This option also includes courses in ground control, mine plant design, and mine water control.

The students in all options receive an introduction to the managerial, financial, environmental, and social apsects incident to the operation of a mining enterprise through courses incorporated into the curriculum.

In the fourth year, the student may specialize in coal mining, ore mining, or other phases of mining engineering by proper selection of design problems and electives. The student will be assigned an adviser who will assist in this phase of the program.

Local coal fields, mines, and preparation plants are used extensively for experimental, instructional, and field work.

Engineering of Mines

E.M. 102 — Three-Week Summer Session. 3 hr. *(all (All Options)*

Underground Mining Option

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
E.M. 108	3	I.E. 281	3	E.M. 241	3	E.M. 220	3
E.E. 105	4	E.M. 212	3	E.M. 213	3	Prof. elect.	6
C.E. 115	3	Prof. elect.	3	Core elect.	3	Core elect.	3
Core elect.	3	Core	6	Tech. elect.	3		
M.E.M. 43	3			E.M. 22	3		
	16		15		15		12

Total: 132 hr.

Surface Mining Option

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
E.M. 108	3	I.E. 281	3	E.M. 241	3	E.M. 220	3
E.E. 105	4	E.M. 290	3	E.M. 247	3	C.E. 180	4
C.E. 115	3	Prof. elect.	3	Core elect.	9	Prof. elect.	6
M.E.M. 43	3	Core	6				
Tech. elect.	3						
	16		15		15		13

Total: 133 hr.

Health and Safety Option

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
E.M. 108	3	I.E. 281	3	E.M. 241	3	E.M. 220	3
E.E. 105	4	E.M. 215	3	E.M. 216	3	Prof. elect.	6
C.E. 115	3	Prof. elect.	3	E.M. 213	3	Core elect.	3
M.E.M. 43	3	Core elect.	6	Core elect.	6		
Tech. elect.	3						
	16		15		15		12

Total: 132 hr.

Desirable Professional electives include: M. 250, M.P.E. 209, 217, 218, and all E.M. undergraduate courses.

Technical electives include courses in applied science or technical in nature, pertinent to the option selected, and offered outside the Engineering of Mines program.

Petroleum Engineering

Degree: Bachelor of Science in Petroleum Engineering

Petroleum engineering deals with the discovery, production, and transportation of oil and natural gas. Consequently, the petroleum engineer must be thoroughly familiar with the principles of geology as related to the occurrence, discovery, and production of natural gas and petroleum. This knowledge is obtained by the study of geology as well as by the study of geological principles developed in courses relating to oil field development and production. In addition, the petroleum engineer must be well grounded in the principles of oil and gas production, as well as in the technology of transportation. This training may be obtained in the several courses pertaining to petroleum technology and in natural gas engineering and distribution, as well as the courses given in the engineering and basic sciences and in mathematics. There is a strong trend toward employing petroleum engineers as supervisors, managers, and executives. Education for this type of career is provided by the courses in property evaluation, as well as in the humanities. In the senior year, electives are provided in which the student may obtain additional training in management, in supervisory skills, or in some special phase of petroleum and natural gas technology. Assistance in this phase of the program will be given by an adviser assigned to the student.

The College of Mineral and Energy Resources is particularly fortunate that West Virginia is a petroleum and natural gas producing state, and as a result local production and gas storage fields, secondary recovery projects, and compressor stations provide excellent opportunities for field study of petroleum engineering problems, techniques, and methods. The petroleum laboratories of

the college are well equipped for laboratory study of gas measurement apparatus and for core analysis, as well as for the study of drilling muds.

Petroleum Engineering

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
Pet.E. 210	3	Geol. 272	3	M.E.M. 101	3	Core elect.	9
Pet.E. 236	3	I.E. 281	3	Core elect.	6	Prof. elect.	3
Pet.E. 233	3	Pet.E. 211	3	Prof. elect.	4	Prof. elect.	3
Chem. 141	3	Pet.E. 235	3	C.E. 115	3		
Chem. 142	1	Prof. elect.	3				
M.E.M. 43	3						
Prof. elect.	1						
	17		15		16		15

Total: 134 hr.

Desirable Professional electives include M. 250 and all Pet.E. undergraduate courses.

Mineral Processing Engineering

Degree: Bachelor of Science in Mineral Processing Engineering

Mineral processing engineering is a high technology which separates solid particulates based on subtle physical and physical chemical differences. Specific application includes coal cleaning in which the coal is economically separated from waste minerals such as pyrite and shales; upgrading of metalliferous ore, separating recycled materials into their constituent parts and reclaiming metal, glass and fuel values from urban waste. Recently passed federal regulations mandating the cleaning of coal will increase the number and quality of mineral processing engineers required for the next two decades. National Academy of Science estimates that eight billion dollars will be invested in the coming decade to construct new coal cleaning plants — many of which will be in West Virginia.

A mineral processing engineer should be well based in science, mathematics, and engineering sciences as preparation for professional courses. Especially important for professional application are courses which develop skills in the chemical and physical principles employed in mineral processing; those which provide insights into physical and physical chemical properties of minerals and fuels, and the specific courses of analysis, synthesis, and design of minerals-related processes.

Mineral Processing Engineering

THIRD YEAR				FOURTH YEAR			
First Sem.	*Hr.*	*Second Sem.*	*Hr.*	*First Sem.*	*Hr.*	*Second Sem.*	*Hr.*
M.P.E. 217	3	M.P.E. 209	3	M.P.E. 218	3	M.P.E. 271	3
Ch.E. 40	2	Ch.E. 41	2	M.P.E. 270	3	Prof. elects.	6
E.E. 105	4	C.E. 115	3	M.P.E. 250	3	Core A, B	6
M.E.M. 43	3	Core elect.	3	Ch.E. 231	3		
Chem. 141	3	M.P.E. 104	3	Core A, B	6		
Chem. 142	1	Prof. elect.	3				
	16		17		18		15

Total: 137 hr.

Desirable Professional electives include M. 250, E.M. 224, all M.P.E. undergraduate courses, and courses in organic chemistry.

Courses of Instruction in Mineral and Energy Resources

Minerals (M.)

1. *Mineral Engineering Problem Solving.* I. 3 hr. Freshman orientation to the College of Mineral and Energy Resources including grade-point calculation, University registration procedures, *Student Handbook,* financial aid, student chapter of AIME, academic programs in the college, library programs, mineral and energy conservation, dimensional relationships, basic dimensional analysis, basic engineering graphics, vectors, descriptive geometry, area and volume, sedimentary rocks and map interpretation, drafting and lettering. 2 hr. lec., 3 hr. lab.

2. *Mineral Engineering Problem Solving.* II. 3 hr. PR or Conc.: Math. 15. Principles of surveying and introduction to FORTRAN programming. 2 hr. lec., 3 hr. lab.

19. *Energy Technologies for the Future.* I. 3 hr. Technological aspects of the energy crisis with special attention to upcoming systems likely to influence energy production patterns; distribution modes and utilization methods. 3 hr. lec.

20. *Materials Technologies for the Future.* II. 3 hr. Technological aspects of materials innovation and substitution. Upcoming changes in sources, processing, and utilization of materials. 3 hr. lec.

106. *Mineralogy.* I. 2 hr. PR: Chem. 16. Mineral identification, chemical analysis of minerals; occurrence, geographic distribution and utilization of minerals; elements of crystallography. Two 3-hr. labs.

207. *Earthquake Seismology.* II. 3 hr. PR: Phys. 11. Earthquakes, their causes and area distribution; theory of elastic waves; principles of seismograph construction, adjustment and operation; interpretation and calculation of seismograms with exercises provided by records of the University seismography station. 3 hr. lec.

230. *Elements of Geophysical Prospecting.* I. 3 or 4 hr. PR: Geol. 1, Phys. 11. Locating subsurface oil, gas, and mineral deposits. Field investigation using instruments with 4 hr. section.

234. *Applied Geophysics.* II. 3 hr. PR: Phys. 12 and Geol. 151 or consent. Origin of the universe and the planets, heat and age of the earth. Application of the science of geophysics in the location of analysis of earthquakes and in prospecting for oil and minerals.

250. *Evaluation of Capital and Operating Costs.* I, II. 3 hr. PR: Math. 18 or consent. Estimating capital and operating costs of mineral industries. Evaluation of potential investments, comparisons of investment alternatives, estimation of profitability, and payout of new ventures. Special problems of investment decisions in mining, petroleum, and other facets of the mineral industries. 3 hr. lec.

301. *Topics in Resource Science.* S. 3 hr. PR: Chem. 141, Geol. 151, Com. S. 261. Relationship between entropy and geologic anomalies, mineral occurrence models, resource conservation, and entropic balances. 3 hr. lec.

Engineering of Mines (E.M.)

102. *Mine Surveying.* SI. 3 hr. PR: M. 2, Math. 15. Surface and subsurface surveying, celestial observations, and related calculations together with intensive field practice in underground and surface surveying. Lectures and field work arranged.

108. *Fundamentals of Mining.* I, II. 3 hr. PR: Geol. 1, Math. 17, Phys. 12, E.M. 102. Mineral prospecting, drilling, explosives, mining methods for bedded deposits and ore bodies, timbering, and application of mining machinery. 3 hr. lec.

112. *Mine Plant Design.* II. 3 hr. PR: E.M. 212, M.E.M. 42, and C.E. 115 or concurrent enrollment. Applications of the principles of mechanics and mining technology to the analysis and design of mine building, head-frames, bins, skips and cages. 2 hr. lec., 3 hr. lab.

201. *Fire Control Engineering.* II. 3-4 hr. PR: Senior standing in an engineering curriculum or consent. Aspects involved in the control from fire, explosion, and other related hazards. Protective considerations in building design and construction. Fire and explosive protection organization including fire detection and control. Lectures (3) and/or 3 hr. lab.

212. *Advanced Mining.* I, II. 3 hr. PR: E.M. 108; PR or Conc.: E.E. 105. Engineering principles, methods, and equipment applied to transportation, hoisting, and drainage. 3 hr. lec.

213. *Mine Ventilation.* I, II. 3 hr. PR: E.M. 108, M.E.M. 42, C.E. 115. Engineering principles, purposes, methods, and equipment applied to the ventilation of mines. 2 hr. lec., 3 hr. lab.

215. *Industrial Safety Engineering.* II. 3 hr. PR: Junior standing or consent. Problems of industrial safety and accident prevention, laws pertaining to industrial safety and health, compensation plans and laws, and industrial property protection. 2 hr. lec.

216. *Mine Safety Engineering.* I. 3 hr. PR: E.M. 108, 215. Analysis and application of mining health and safety laws to the work processes of the mining industry.

219. *Advanced Mining Methods for Vein Deposits.* II. 3 hr. PR: E.M. 108. Methods and systems of mining other than flat seams. Emphasis on selection of methods in relation to cohesive strength of ore bodies and their enclosing wall rocks. Mining of anthracite included. 3 hr. lec.

220. *Mine Design.* I, II, S. 3 hr. PR: E.M. 212, 213, 241, and senior standing. Comprehensive design problem involving underground mining developments or surface plant or both, as elected by the student in consultation with instructor. Preparation of a complete report on the problem required, including drawings, specifications, and cost analysis. 9 hr. lab.

221. *Mine Design.* II. 2 hr. PR: E.M. 212, 213, 241. Design principles and methods pertaining to mine water treatment, refuse disposal and treatment, dust control systems, reclamation and revegetation. 6 hr. lab.

222. *Mine Equipment and Machinery.* I, II. 3 hr. PR: E.E. 105, E.M. 212. Selection, installation, operation, and maintenance of mining equipment. 3 hr. lec.

223. *Mine Management.* II. 3 hr. PR: Math. 18, E.M. 108, 212, and senior standing. Economic, governmental, social, cost, and labor apsects of mining as related to the management of a mining enterprise. 3 hr. lec.

224. *Mining Engineering Problems.* I, II. 1-6 hr. PR: Senior or graduate standing or consent. Special problems in mining engineering, including choices among operations research, mine systems analysis, coal and mineral preparation, and coal science and technology.

228. *Mine Equipment and Machinery Controls.* I. 3 hr. PR: E.M. 222 or consent. Principles, application, and use of electric and hydraulic devices and circuits for protection and control of mine machinery and equipment. 3 hr. lec.

229. *Advanced Mining Equipment Applications.* II. 3 hr. PR: E.M. 228. Structural, mechanical, hydraulic, and electrical characteristics of the more common items of mining equipment. Controls, electrical and hydraulic circuits, and mechanical transmissions with associated problems. Laboratory design of a control system for a mining machine. 2 hr. lec., 3 hr. lab.

241. *Mechanics of Ground Control in Mines.* I, II. 3 hr. PR: E.M. 108, M.E.M. 42 or consent. Rock properties and behavior, *in situ* stress field, mine layout and geological effects: designs of entry and pillar and roof bolting, convergence of openings and surface subsidence engineering. 1-hr. lab.

247. *Explosives Engineering.* I. 3 hr. PR: Chem. 16, M.E.M. 43. Theory and application of explosives, composition and characteristics of explosives, blasting design fundamentals, legal and safety considerations. 3 hr. lec.

249. *Rock Mechanics.* II. 3 hr. PR: M.E.M. 43 or consent. Elastic and plastic properties of rock, Mohr's criteria of failure, elastic theory, stress distributions around underground openings, open pit and underground stability rock testing techniques. 2 hr. lec. 1 hr. lab.

290. *Surface Mining.* II. 3 hr. PR: E.M. 108, Geol. 151, M.E.M. 43 or consent. Open pit mining, quarrying, and stripping, with emphasis on planning, production, and equipment systems.

301, 302. *Advanced Mine Design.* I, II. Credit arranged. Advanced detail design and layout of coal mine plant, particularly incorporating new ideas of machines and mining methods.

307. *Explosive Engineering Design.* II. 3 hr. PR: E.M. 247 or consent. Rock drilling, total blast systems simulation, experimental studies in blast design, rock fracturing, chemical thermodynamics, kinetics, and reaction rates. 3 hr. lec.

311. *Advanced Ground Control — Coal Mines.* I. 3 hr. PR: E.M. 241 or consent. Ground and strata control for underground and surface coal mining, including slope stability and subsidence.

316. *Advanced Rock Mechanics.* II. 3 hr. PR: E.M. 249 or consent. Testing techniques and interpretation, strength and fracture, classification, anisotropy, friction, jointed rock, fluid pressure, fragmentation, and excavation.

351. *Coal Mining.* S. 3 hr. PR: Chemistry, 10 hr.; Physics, 8 hr.; and accompanied or preceded by general geology. Especially for students who are planning to teach mining subjects in high school. *(Not open to students taking E.M. 108 or 212.)*

365. *Advanced Deterministic Methods for Mineral Engineers.* I. 3 hr. Analysis and solution of mineral engineering problems which require use of deterministic models. Application of deterministic methods to mineral transportation, mineral resource allocation and extraction problems, and mine planning and equipment utilization problems. 3 hr. lec.

366. *Advanced Stochastic Methods for Mineral Engineers.* II. 3 hr. Application of stochastic methods to mineral engineering problems in equipment selection, renewal processes, mine ventilation, mine production, and mineral extraction. 3 hr. lec.

395, 396. *Graduate Seminar in Coal Mine Operation and Administration.* I, II. 3-6 hr. PR: B.S. degree and consent of committee. Problems related to production, preparation, marketing, and utilization of coal, with special assignments and emphasis in accordance with personal background and field of interest of student

Petroleum Engineering (Pet.E.)

207. *Natural Gas Engineering.* I. 4 hr. PR: Pet.E. 211, C.E. 115. Principles of natural gas production, transmission, distribution, processing, regulation, measurement, storage, and analysis with a laboratory devoted to principles of equipment utilized in the operations. 3 hr. lec., 3 hr. lab.

210. *Drilling Engineering.* I. 3 hr. PR or Conc.: Geol. 1, Math. 18, C.E. 115. Rock properties, well-bore hydraulics, air and gas drilling factors affecting penetration rate, slim-hole, lifting capacity liquid, air, or gas, two-phase flow, casing and casing string design, well-bore primary and squeeze cementing, vertical and directional drilling, minimum cost drilling. 3 hr. lec.

211. *Production Engineering.* II. 3 hr. PR: Pet.E. 210. Well completion, performance of productive formation, drill stem tests, completion of wells, flowing wells, gas lift methods and equipment, pumping installation design, well stimulation, emulsion, treating, gathering and storage of oil and gas, field automation. 3 hr. lec.

212. *Drilling Fluids Laboratory.* I. 1 hr. PR or Conc.: Pet.E. 210, Chem. 141, C.E. 115, Drilling fluids control relative to pilot testing, drilling fluid design procedures and measurement of composition and properties. 3 hr. lab. and discussion.

216. *Petroluem Engineering Design.* II. 3 hr. PR: Pet.E. 234. Comprehensive problem in design involving systems in oil and gas production, field processing, transportation, and storage. Three 3-hr. labs.

224. *Petroleum Engineering Problems.* I, II. 1-6 hr. PR: Graduate or senior standing. Investigation and detailed report on a special problem in petroleum or natural gas engineering. Supervised by a member of the faculty.

233. *Elements of Petroleum Reservoir Engineering.* II. 3 hr. PR: Pet.E. 236. Basic properties of petroluem reservoir rocks. Fluid flow through porous materials. Evaluation of oil and gas reserves. 3 hr. lec.

234. *Applied Petroleum Reservoir Engineering.* I. 3 hr. PR: Pet.E. 233. Application of reservoir engineering data to calculation of recovery potentials and to analysis, simulation and prediction of reservoir performance under a variety of production methods to effect maximum conservation. 3 hr. lec.

235. *Formation Evaluation.* II. 3 hr. PR: Math. 17, Pet.E. 210 or consent. Various well logging methods and related calculations with exercises in interpretation of data from actual well logs. 2 hr. lec., 3 hr. lab.

236. *Mechanics of Hydrocarbon Fluids.* I. 3 hr. PR or Conc.: Chem. 141. Qualitative and quantitative phase behavior of single and multicomponent hydrocarbon systems with emphasis on application to petroleum production engineering and petroleum reservoir engineering. 2 hr. lec., 3 hr. lab.

241. *Oil and Gas Property Evaluation.* II. 3 hr. PR: Pet.E. 211, 234, 235. Petroleum property evaluation. Calculation of reserves and future reservoir performance, decline curves, production and formation testing, pressure transient analysis, reservoir test limit, analysis of data, curve fitting, evaluation of processing facilities, and analysis of profitability. 3 hr. lec.

244. *Petroleum Reservoir Engineering Laboratory.* II. 1 hr. PR or Conc.: Pet.E. 233. Laboratory evaluation of basic and special petroleum reservoir rock properties.

300. *Hydrocarbon Production From Carbonate Rocks.* I. 3 hr. PR: Pet.E. 233, 235. Theory on the production of oil and gas from carbonate rocks, definition and classification of pore geometry, fluid flow characteristics, performance of carbonate rock reservoirs and simulation of these reservoirs. 3 hr. lec.

301. *Advanced Petroleum and Natural Gas Engineering Design.* I, II. Credit arranged. PR: Graduate or senior standing. Advanced detail design problems in some phases of petroleum and natural gas exploration, production, and transportation, particularly incorporating new ideas, machines, and methods.

302. *Fluid Flow in Porous Media.* I. 3 hr. PR: Pet.E. 234, Math. 18 or consent. Theoretical and practical aspects of physical principles of hydrodynamics in porous media. 3 hr. lec.

340. *Secondary Recovery of Oil by Water Flooding.* II. 3 hr. PR: Pet.E. 233. Theory of immiscible fluid displacement mechanism, evaluation and economics of water flood projects, and oil field flooding techniques. 3 hr. lec.

342. *Well Stimulation by Hydraulic Fracturing.* I. 3 hr. PR: Pet.E. 210, 233. Hydraulic fracturing fluids. Parameters involved in fracturing. Fracture initiation, orientation, and extension. Productivity increase after fracturing. Propping agents and general fracturing treatment design. Optimization of fracturing cost. 3 hr. lec.

343. *Advanced Secondary Recovery.* I. 3 hr. PR: Pet.E. 340. Secondary recovery of oil by gas flooding, miscible fluid injection, *in situ* combustion, and heat injection. 3 hr. lec.

362. *Reservoir Simulation and Modeling.* II. 3 hr. PR: Pet.E. 233, I.E. 281, or consent. Finite difference equations and their applications for fluid flow equations in porous media, types of grids, explicit and implicit schemes, material balance equation for oil and gas reservoirs, solution of single-phase, two-phase and three-phase flow in one, two and three dimensions, simulation of depletion drive reservoirs, gas reservoirs, and other simulation methods. 3 hr. lec.

394. *Special Topics.* I, II. 1-6 hr. PR: Consent. Selected fields of study in petroleum and natural gas engineering.

Mineral Processing Engineering (M.P.E.)

103. *Physical and Chemical Changes in Mineral Beneficiation and Utilization.* I. 4 hr. PR: Chem. 15 and Math. 15. Mineral processing fundamentals from the viewpoint of chemical and physical changes including float-sink phenomena, froth-flotation effects, and others. 3 hr. lec., 3 hr. lab.

104. *Physical and Chemical Changes in Mineral Beneficiation and Utilization.* II. 3 hr. PR: M.P.E. 103. Applications of physical, chemical, and thermodynamic principles in the areas of coal preparation and conversion. Calculations of mean energy values for coal. 3 hr. lec.

203. *Theory of Coal Processing.* I. 3 hr. PR: Chem. 16. Origin, petrography, and classification of coals discussed and correlated to the technological properties of coal which, in turn, are related to processability. 2 hr. lec., 3 hr. lab.

209. *Mineral Preparation.* II. 3 hr. PR: Math. 18, M.E.M. 42. PR or Conc.: C.E. 115. Preparation, beneficiation, and concentration of metallic and nonmetallic ores for further processing or utilization. 2 hr. lec., 3 hr. lab.

217. *Coal Preparation.* I, II. 3 hr. PR: Consent. Formation of coal, rank classification of coal, coal petrography, principles of preparing and beneficiating coal for market with laboratory devoted to sampling, screen analysis, float and sink separation, and use of various types of coal cleaning equipment. 2 hr. lec., 3 hr. lab.

218. *Advanced Mineral Preparation.* I. 3 hr. PR: M.P.E. 209, I.E. 281. Theory and practice of concentration of ores and industrial minerals with special consideration to more recent advances in beneficiation of ores and coal. 2 hr. lec., 3 hr. lab.

224. *Mineral Problems.* I, II. 1 to 6 hr. PR: Senior or graduate standing or consent. Special problems considered in minerals beneficiation and processing, including choices among design and research projects in coal preparation, coal conversion, (process) hydro- and extractive metallurgy or minerals economy.

233. *Theory and Practice of Coal Preparation.* S, I. 3 hr. PR: Consent. Physical and chemical theory of coal preparation technology with emphasis on the application of modern coal cleaning equipment. This course is designed for high school teachers seeking background in the field of coal processing. 2 hr. lec., 3 hr. lab.

250. *Control Systems in Mineral Processing.* II. 3 hr. PR: Junior standing in mineral processing engineering. The instrumentation and automatic control systems used in today's mineral processing technology are studied not only to cover data recording and control but also to learn process optimization. 3 hr. lec.

270. *Design and Synthesis.* I, II. 3 hr. PR: Consent. The logic and quantitative tools required for synthesizing mineral processing systems are brought to bear on a realistic problem by students working independently. Specific attention on economic and environmental implications. 1 hr. lec., 6 hr. lab.

271. *Design and Synthesis.* I, II. 3 hr. PR: M.P.E. 270. Continuation of M.P.E. 270. 1 hr. lec., 6 hr. lab.

Mineral Resources Program (M.E.R.)

97. *Man's Energy Needs and Resource Limitations.* I, II. 3 hr. *(Open to any WVU student.)* Dilemmas posed for backward and modern societies by rising energy demands amid concerns for the world's environment, given existing resources constraints. Conventional technologies and historical concerns over resource scarcities. Implications for welfare economics. Impact of technological change and both future and exotic energy systems. 3 hr. lec.

98. *National Resource and Energy Policy Problems.* I, II. 3 hr. *(Open to any WVU student.)* Resource and energy policy problems as currently formulated and treated on a national level by the Department of the Interior, including mineral import quotas, prorationing, federal tax and land law policy, leasing, mineral research and education, health and social concerns. Use of confrontation by citizen action as a catalyst for changing mineral engineering practice. 3 hr. lec.

101. *Principles of Resource and Energy Economics.* I. 3 hr. PR: Econ. 54 or consent. Analyzes background for problems important or peculiar to mineral industry economics: exhaustion, externalities, commodity trading, conservation, and the special role of minerals in development and international trade. The analyses of monopoly regulation, antitrust action, and resource planning are presented, and projections made for energy, major metals and industrial minerals. 3 hr. lec.

200. *Elements of Mineral Conservation.* I. 3 hr. PR: Junior standing. *(Open to any WVU student.)* Economics of conservation for nonrenewable resources; traditional and modern views; new environmentalist concerns. Current and forecast demand and supply conditions for mineral and energy resources including coal, water, oil, gas, ores, and industrial minerals; causes of mineral loss and environmental costs in production and utilization; methods of environmental control and conservation in underground and surface mining. 3 hr. lec.

210. *The Economics of the Mineral Industries.* II. 3 hr. Analyzes for the nonfuels resource availabilities, market structure, characteristics, and long run demands. Regional impacts are considered as these relate to national mineral policies and environmental controls. 3 hr. lec.

222. *Energy Economics.* I. 3 hr. Analyzes energy sector of the economy, inter-fuel competition, current and future markets, and international trade. New energy technologies. 3 hr. lec.

300. *Minerals Technology Forecasting.* I, II. 3 hr. PR: Consent. Introduction and review of techniques used for forecasting materials technology. Detailed basic principles. Intended for users and evaluators of these techniques.

301. *Minerals Technology Assessment.* I, II. 3 hr. PR: Consent. Introduction and review of methods applied to the systematic study of the effects on society that may occur when mineral technology is introduced, extended, or modified.

310. *Hydrometallurgy I.* I. 3 hr. PR: M.P.E. 181. Introduction to hydrometallurgy, covering the principles of hydrometallurgy and their applications. Structure of H_2O, theory of leaching, and practical leaching systems. 3 hr. lec.

311. *Hydrometallurgy II.* II. 3 hr. PR: M.E.R. 310. Continuation of M.E.R. 310. Includes studying a detailed review of principles of hydrometallurgy and a study of the unit operations in hydrometallurgy. Application of solvent extraction. 3 hr. lec.

320. *Advanced Mineral Engineering I.* I. 4 hr. PR: Consent. Advanced problems in coal and mineral processing for the mature student using an extensive technical background. 1 hr. lec., 9 hr. lab.

321. *Advanced Mineral Engineering II.* II. 4 hr. PR: M.E.R. 320. Continuation of M.E.R. 320. 1 hr. lec., 9 hr. lab.

324. *Advanced Special Topics.* I and II. 1-6 hr. PR: Consent. Special advanced problems in mineral process engineering including choices among topics related to coal preparation, conversion, and process metallurgy.

350. *Readings in Mineral Resource and Energy Economics.* I, II. 3 hr. Review of current mineral economic studies. Selected authors in mineral science and engineering, the economics of natural resource exploitation and environmental control, national mineral policy, world mineral development and trade. 1 hr. lec. and independent study.

351. *Mineral Resource Appraisal and Exploration Decisions.* II. 3 hr. Introduces appraisal techniques for mineral resources including spatial models of occurrence and geostatistical models. Relation of changes in infrastructure and market demands to the value of regional resources. 3 hr. lec.

381. *Theory and Policy of Mineral Economics.* II. 3 hr. Defines the pure theory of resources and energy allocation with technologic, geologic, and environmental constraints. A general model is presented with partial and special applications for major problem areas: resource valuation, conservation, exhaustion, taxation, and trade. Problems of imperfect competition and monopoly open consideration to the foundations of policy in practice and theory. 3 hr. lec.

392. *The Economics of the Energy and Petrochemical Sectors.* I. 3 hr. PR; Consent. Energy and petrochemical complexes are defined within an open activity analysis model. The problems explored include forecasting energy demands, joint production and costing, environmental controls, and impacts on regional and international trade. 3 hr. lec.

394. *Special Topics in Mineral Economics.* I, II. 6 hr. PR: Consent. Selected economic problems in petroleum and natural gas engineering and the mineral industries. 3 hr. lec.

398. *Models of Mineral Commodity Markets and Industries.* II. 3 hr. Econometric studies analyzing the behavior and problems of selected mineral industries and commodities from the viewpoint of the firm, industry, and region of interest. Applications include programming techniques. 3 hr. lec.

Multidisciplinary Studies

Multidisciplinary Studies (MDS) courses are those which: (a) analyze significant issues, problems, or themes by applying two or more disciplines to them; or (b) explore the theoretical and methodological relationship of two or more disciplines to each other; and (c) involve a combination of disciplines so as to preclude their being classified realistically as one of humanities, social science, or physical science.

Responsibility for approving MDS courses rests with the Core Curriculum Committee and the University Senate. Each course has its own staff, drawn from the faculties of the schools and colleges of the University.

The MDS courses listed here may be credited to Core, as indicated.

Multidisciplinary Studies (MDS)

1. *The Nature of Evidence.* I, II. 3 hr. Various professionals explore how problems are solved and conclusions reached in the arts and the sciences. While learning to base beliefs on evidence, the student will explore various methods for evaluating the bases of knowledge claims and decisionmaking. *(May be credited to University Core A or B or C.)*

2. *Genetics, Society and Human Affairs.* I. 3 hr. Origin of life, selection, mutation, eugenics, genetic engineering, genetics and evolution, genetics and medicine, genetics and politics, decisionmaking, social and ethical issues in human genetics. For students interested in heredity and heritage. *(May be credited to University Core B or C.)*

60. *Human Sexuality.* II. 3 hr. A study of the biological, behavioral, and societal aspects of sexuality. Issues considered include: changing fecundity; socio-legal implications; sex roles; venereal disease; populations; erotica; aging; dysfunctions; decision-making skills for sex-related issues. *(May be credited to University Core B or C.)*

80. *Special Topics.* I. II. 1-3 hr.

90. *Man and Food.* I, II. 3 hr. Exploration on a global basis of interactions of man and environment as reflected in food production systems. Relation of food supply and use to development or maintenance of social and political institutions. *(May be credited to University Core A or B or C.)*

91. *Introduction to Technology and Society I.* I. 3 hr. A team-taught introduction to technology (its nature and goals) and society (its nature and goals) in Victorian era. *(May be credited to University Core A or B or C.)*

92. *Introduction to Technology and Society II.* II. 3 hr. PR: MDS 91. Continuation of MDS 91. *(May be credited to University Core A or B or C.)*

School of Nursing

Admission

To qualify for admission to the School of Nursing basic program a candidate must have completed one year of prescribed courses in an accredited college or university. These prescribed courses are: Chemistry, 8 hours; English Composition, 6 hours; Sociology, 3 hours; Introductory Psychology, 3 hours; Core subjects, Physical Education and/or electives, 12 hours.

The program within the School of Nursing consists of one summer session and three academic years. The summer session follows completion of the sophomore years.

A dominant factor in the number of students admitted is the limitation of space. A second factor is the academic record of the applicant. The minimum grade-point average for the West Virginia applicant is 2.5; for out-of-state applicants it is 3.4. West Virginia applicants whose grade-point average falls between 2.3 and 2.5 may petition in writing to the Admissions Committee for special consideration. Such a petition must clearly state the reason(s) why the applicant should receive special consideration. Petitions would be submitted along with the application to nursing.

Out-of-state residents with a grade-point average of 3.2 and 3.4 may petition in the same manner. *Since West Virginia University is a state university, no more than 10 percent of those admitted may be from out of state.*

The review of applicants takes approximately two to three months. The students are notified by mail after review of all applicants is completed. Two weeks after receipt of the letter of acceptance, the student must send a letter stating acceptance of the position to the Assistant to the Dean of Admissions and Records, WVU Medical Center, Morgantown, WV 26506. A $50.00 advance deposit must accompany the letter. This deposit is applied toward the registration fees for the first semester. The deposit is nonrefundable should the student decide not to enter after formally accepting a place in the class.

The School of Nursing will identify ten in-state alternate candidates and three out-of-state alternate candidates. In the event that a student chooses not to accept a place in the class, an alternate will be chosen by the same review process. Vacancies may occur and will be filled up to the last day to register.

Application for admission to the School of Nursing should be made January 1 of the year the candidate wishes to be admitted. These may be presented in person or mailed directly to: Assistant to the Dean of Admissions and Records, WVU Medical Center, Morgantown, WV 26506. An application fee of $10.00, payable to West Virginia University, must accompany the completed application.

Transfer Students

A student from an accredited college or university is eligible for admission by presenting a record of courses comparable to those required in this curriculum, except for courses in Orientation to Nursing. Application for transfer students should be initiated by January 1 in order to allow time for evaluation and processing of credentials. Deadline for receipt of transcripts is March 1. Apply to: Assistant to the Dean of Admissions and Records, WVU Medical Center, Morgantown, WV 26506.

Registered Nurse Students

The School of Nursing offers graduates of diploma and associate degree nursing programs the opportunity to complete requirements for the baccalaureate degree in nursing at the Morgantown campus and at the Charleston Division of the WVU Medical Center. General education credits earned in any accredited college or university may be applied toward the fulfillment of the degree requirements, if the course work is comparable.

Registered Nurse applicants are admitted directly to the School of Nursing. Acceptance and placement in the program is dependent upon the individual's academic record and upon the number of spaces available in the program. The license to practice nursing and a grade-point average of 2.5, or better, are required.

Fifteen to 18 semester hours, or equivalent, of general education (core) courses are prerequisite to Nursing 99 — Basic Concepts of Professional Nursing. Any distribution and/or combination of comparable courses from the following list is appropriate: English 1 and 2, 6 semester hours; Chemistry, 6-8 semester hours; Introductory Psychology, 3 semester hours; Introductory Sociology, 3 semester hours; Anatomy, 3-4 semester hours; Physiology, 3-4 semester hours; Microbiology, 3-4 semester hours; Pharmacology and Toxicology, 3-4 semester hours; Nutrition, 3 semester hours. Additional Core A, B, or elective credit before enrolling in Nursing 99 is advised. One semester of chemistry is required. The second semester may be waived if the applicant has successfully completed comparable laboratory science courses and meets other science requirements (anatomy, physiology, microbiology, and pharmacology and toxicology). Upon review of the student's background, additional physical and behavioral sciences may be advised, based on the judgment of the student's adviser.

Upon admission, each student is assigned an adviser who reviews the academic record with the student. A tentative plan of progression evolves from this joint review.

All registered nurse students are required to enroll in Nursing 99. Upon completion of that course, each student — in collaboration with the faculty adviser — will design a plan for completion of the curriculum in accordance with career goals. Graduates of associate degree programs transfer 18 hours of lower-division nursing credit. Graduates of diploma programs must establish 18 hours of lower-division credit by comprehensive challenge examination.

Upon successful completion of Nursing 99, and the establishment of lower-division credit when applicable, the registered nurse student is eligible for the advanced placement experiences. This experience is a conceptual approach to the challenge of the junior courses. During this experience a diagnostic and prescriptive analysis of the learning needs of the individual student is made. This forms the basis for the plan of progression through the remainder of the upper-division courses. Upon successful completion of the advanced placement experience, the student may choose either to enroll in junior courses or senior courses. The student who is unsuccessful in the advanced placement experience enrolls in the junior courses. All prerequisites for the senior courses must be met before advancement to senior nursing courses.

A minimum of 20 hours of upper-division courses must be taken by enrollment.

Credit for all courses must be established by enrollment or by advanced placement.

Upon receipt of a letter of acceptance into the program, applicants must send a letter, stating intent to enroll, to the Assistant to the Dean of Admissions and Records, WVU Medical Center, Morgantown, WV 26506. A $50.00 advance tuition deposit should accompany the letter. This deposit is nonrefundable should the student decide not to enter after formally accepting a place in the class.

Requests for information and application forms for the Morgantown campus should be addressed to the Assistant to the Dean of Admissions and Records, WVU Medical Center, Morgantown, WV 26506.

Application forms and information concerning the program at Charleston may be obtained from the Student Affairs Coordinator, Charleston Division, WVU Medical Center, 3110 MacCorkle Ave., S.E., Charleston, WV 25304.

Curriculum and Courses

For complete information concerning curriculum and courses of instruction in the School of Nursing, see the *WVU Medical Center Catalog*.

School of Pharmacy

Pharmacy was first offered at West Virginia University as a department in the School of Medicine, beginning in 1914. It was changed to the College of Pharmacy in 1936 and to the School of Pharmacy in 1958.

In 1960, the School of Pharmacy changed from a four-year to a five-year program, including two years of pre-pharmacy. The pharmacy curriculum consists of three years of professional study preceded by a minimum of two years of study in an accredited college of arts and sciences.

The School of Pharmacy is accredited by the American Council on Pharmaceutical Education which is composed of members from American Pharmaceutical Association, National Association of Boards of Pharmacy, American Association of Colleges of Pharmacy, and American Council on Education.

The School of Pharmacy holds membership in the American Association of Colleges of Pharmacy whose object is to promote the interests of pharmaceutical education. All institutional members must maintain certain requirements for entrance and graduation.

Admission

All students planning to seek enrollment in the School of Pharmacy must comply with regulations appearing in the current *WVU Undergraduate Catalog.*

Students preparing for the study of pharmacy may satisfy the requirements for entrance into the School of Pharmacy by majoring in any arts and sciences subject and including in their course selection the following or their equivalents:

English Composition	6 hr.	Chemistry, General	8 hr.
College Algebra	3 hr.	Chemistry, Organic	8 hr.
Trigonometry	3 hr.	Physics	8 hr.
Principles of Economics	6 hr.	Electives (Core A & B)	18 hr.
Biology, General	8 hr.		
		TOTAL	68 hr.

Electives must be designed to satisfy University Core Curriculum requirements.

Because of the large number of applicants and limited openings available, preference in admissions is given to qualified West Virginians although outstanding nonresident applicants wtll be considered. Careful consideration is given to those personal qualifications which bear upon fitness of applicants for the study and practice of the profession.

Admissions are competitive and are based on the cumulative academic average and science average achieved in all prior college courses, a personal interview, and the results of the Pharmacy College Admission Test (PCAT.)

For admission to the School of Pharmacy, formal application should be made to the Admissions Committee of the school as early as possible after Janury 1, but before April 1, preceding the fall term (first semester) in which the student is seeking enrollment. Applicants should write to the Office of Admissions and Records, WVU Medical Center, for official blanks on which formal application must be made. A $10.00 application fee is required and must accompany the application.

Each applicant is expected to deposit $50.00 before the applicant's name is entered upon the official list of those accepted to the School of Pharmacy. If the applicant enrolls, this sum is applied to the first semester tuition. If the applicant fails to enroll, this deposit fee is forfeited.

It is required that during the first semester of the first year all students must complete certain prescribed immunization and diagnostic procedures.

Complete information may be obtained from the Dean of the School of Pharmacy, or from the Office of Admissions and Records, WVU Medical Center.

Pharmacy College Admission Test

Completion of the Pharmacy College Admission Test is required for admission. It is strongly recommended that the student take the test in the fall before making application for admission. Information concerning time and place of the test can be obtained from your pre-pharmacy adviser, or by writing: Pharmacy College Admission Test, The Psychological Corporation, 304 East 45th St., New York, NY 10017.

Personal Interviews

A personal interview with the Committee on Admissions will be required. Interviews will be held at the WVU Medical Center and will be arranged as far as possible to suit the convenience of the applicant. They are scheduled during February, March, and April. Only applicants with a cumulative and science average above 2.5 will be called for an interview, unless openings are available.

Admission to Advanced Standing

If space is available, students from other accredited schools of pharmacy may be admitted provided they meet the course requirements of the WVU School of Pharmacy, have a 2.5 average, and are eligible for readmission for the degree in pharmacy in the school previously attended. D grades in professional courses will not be transferred.

Curriculum and Courses

For complete information concerning the curriculum and courses of instruction in the School of Pharmacy, see the *WVU Medical Center Catalog.*

School of Physical Education

The School of Physical Education studies the role of sport athletics, dance, and safety. West Virginia University students are offered opportunities for developing knowledge, attitudes, and skills related to sport athletic coaching, athletic training, dance, and safety activities, issues, and problems.

Students in General Physical Education Program classes have an opportunity to develop knowledge, attitudes, and skills through participation in a variety of sport, dance, and physical activities.

Professional students (Physical Education majors) study the relationship of play games, sport athletics, and dance to our culture and cultures throughout the world. Their preparation includes interdisciplinary studies in areas such as business and economics, journalism, physiology, psychology, and sociology and anthropology.

A large percentage of physical education graduates are employed as school teachers. Their preparation in physical education is designed to acquaint them with the physiological, psychological, and sociological needs of school children as they relate to participation in sport, dance, and physical activity. Other graduates are employed in areas requiring a background in sport, such as boys and girls clubs, YMCAs and YWCAs, private athletic clubs, community and industrial recreation projects, mental and penal institutions, sport writing, sport broadcasting, sport management, sport equipment production, retailing, and marketing, Red Cross, scouts, and private and public camps.

Baccalaureate degree programs offered in the School of Physical Education are: (1) teacher certification in physical education and a second teaching field chosen from many curricula; (2) teacher certification in physical education, health, and safety; and (3) interdisciplinary emphasis programs selected from sport management, sport marketing, sport writing, sport broadcasting, sport physiology, and sport social psychology. Certification also is available in athletic training as a second teaching field, and in athletic coaching. In addition to the bachelors' programs, the School of Physical Education offers undergraduate preparation leading to certification in safety education as a second teaching field.

Degrees at both the master's and doctoral levels are offered in physical education and safety studies. These programs are designed to permit the formulation, systematic analyzation, and dissemination of concepts through research, application, and scholarly effort in the study of sport, dance, and safety. An option under the M.S. degree program in physical education also permits students to take advantage of University-wide expertise in Environmental and/or Occupational Health Studies.

Facilities

Facilities of the School of Physical Education include the gymnasium, dance studio, and swimming pool in Moore Hall; gymnasiums in Stansbury Hall; bowling lanes in Mountainlair; outdoor areas including the stadium, tennis courts, archery range, soccer and field hockey fields; and the Natatorium.

The Coliseum contains the Ray O. Duncan Memorial Library, classrooms and seminar rooms, a large gymnasium, a dance studio, handball and squash courts, adapted physical education and weight training room, safety studies laboratories, human performance laboratories, and faculty offices. (Some faculty and staff are housed in Moore Hall, Stansbury Hall, and the Natatorium.)

Intramural Sports

A broad intramural sports program, which is provided in cooperation with Student Educational Services, encourages students to voluntarily participate in organized sports and recreation.

Faculty

William L. Alsop, Ed.D., (WVU), *Associate Professor of Physical Education.*
Kittie J. Blakemore, M.S. (WVU), *Associate Professor of Physical Education; Women's Basketball Coach.*
William A. Bonsall, M.S. (WVU), *Associate Professor of Physical Education; Gymnastics Coach.*
Samuel Boyd, III, *Instructor (part-time) in Physical Education.*
Marilyn Kay Bowers, M.S. (Ind. St. U.), *Instructor in Physical Education.*
Dana D. Brooks, M.S. (WVU), *Instructor in Physical Education.*
Linda K. Burdette, M.S. (WVU), *Instructor in Physical Education; Women's Gymnastics Coach.*
Leland E. Byrd, Ed.D. (WVU), *Professor of Physical Education.*
Wincie Ann Carruth, Ph.D. (NYU), *Professor Emerita of Physical Education.*
W. Gale Catlett, B.S. (WVU), *Instructor in Physical Education; Head Basketball Coach.*
Frank J. Cignetti, M.Ed. (Ind. St. U., Pa.), *Instructor in Physical Education; Head Football Coach.*
E. Eugene Corum, M.S. (WVU), *Associate Professor of Physical Education.*
Joseph R. Daniels, M.A. (E. Stroudsburg St. C.) *Instructor in Physical Education; Assistant Football Coach.*
Daniel Della-Giustina, Ph.D. (Mich. St. U.), *Professor of Safety Studies.*
J. William Douglas, Ph.D. (Ohio St. U.), *Professor of Physical Education; Chairman of Professional Physical Education.*
Edward F. Etzel, Jr., B.S. (Tenn. Tech. U.), *Instructor (part-time) in Physical Education; Rifle Coach.*
Patricia K. Fehl, Ed.D. (Ind. U.), *Professor of Physical Education; Chairwoman, General Physical Education.*
Garrett W. Ford, M.S. (WVU), *Instructor in Physical Education; Athletic Academic Counselor.*
Kevin H. Gilson, Ed.D. (WVU), *Assistant Professor of Physical Education; Swimming Coach.*
Robert G. Goin, M.S. (WVU), *Instructor in Physical Education; Assistant Athletic Director.*
Albert C. Gwynne, M.S. (WVU), *Associate Professor Emeritus of Physical Education.*
Veronica A. Hammersmith, M.A. (U. Kans.), *Instructor in Physical Education; Women's Softball and Volleyball Coach.*
Stephen Harrick, M.A. (WVU), *Associate Professor Emeritus of Physical Education.*
Jack W. Henry, M.S. (WVU), *Instructor in Physical Education; Assistant Football Coach.*
Kenneth H. Hildreth, Ed.D. (WVU), *Assistant Professor of Safety Studies.*
Beatrice Hurst, M.A. (Columbia U.), *Associate Professor Emerita of Physical Education.*
Glen E. Johnson, M.S. (NW Mo. St. U.), *Instructor in Physical Education; Athletic Trainer.*
Samuel T. Kegerreis, Cert.P.T. (U. Penn.), *Instructor in Physical Education; Athletic Trainer.*
Linda S. King, M.S. (W. Mich. U.), *Instructor in Physical Education; Women's Track and Field Coach.*
Karen P. Krall, B.A. (WVU), *Instructor (part-time) in Physical Education.*
Robert L. Kurucz, Ph.D. (Ohio St. U.), *Professor of Physical Education; Chairman, Graduate Studies Advisory Committe.*
Signe I. Lindell, M.S. (WVU), *Instructor (part-time) in Safety Studies.*
Kathy L. Manger, M.Ed. (Memphis St. U.), *Instructor in Physical Education; Coach of Women's Swimming.*

John C. McGrath, M.S. (Bemidji St. C.), *Instructor in Physical Education and Soccer Coach.*
Gary D. McPherson, M.Ed. (WVU), *Instructor in Physical Education; Associate Basketball Coach.*
C. Everett Marcum, H.S.D. (Ind. U.), *Professor and Chairman of Safety Studies.*
George A. Nedeff, M.S. (WVU), *Assistant Professor of Physical Education.*
Andrew C. Ostrow, Ph.D. (U. Calif.), *Associate Professor of Physical Education.*
Mary Jane Pearse, M.S. (WVU), *Associate Professor of Physical Education.*
Richard Rader, B.S. (WVU), *Instructor in Physical Education; Assistant Football Coach.*
I. Dale Ramsburg, Ed.D. (WVU), *Assistant Professor of Physical Education; Baseball Coach.*
Stanley E. Romanoski, M.S. (WVU), *Instructor in Physical Education; Coach of Track and Cross Country.*
Nick L. Saban, B.S. (Kent St. U.) *Instructor in Physical Education; Assistant Football Coach.*
John Semon, M.S. (WVU), *Associate Professor Emeritus of Physical Education.*
Pete Shaffron, Jr., Ed.D. (WVU), *Assistant Professor of Safety Studies.*
Susan Sherman, *Instructor in Physical Education.*
Linda Ann Skrutski, M.A. (Geo. Wash. U.), *Instructor in Physical Education.*
Bobby Joe Smith, B.S. (WVU), *Instructor in Physical Education; Assistant Basketball Coach.*
Andrew J. Sorine, Ed.D. (WVU), *Assistant Professor of Safety Studies.*
John C. Spiker, M.Ed. (U. Pitt.), *Assistant Professor of Physical Education.*
Gary L. Stevens, A.B. (J. Carroll U.), *Instructor in Physical Education; Assistant Football Coach.*
Janice M. Stocker, Ed.D. (Temple U.), *Associate Professor of Physical Education; Assistant Athletic Director.*
David H. Taylor, M.S. (WVU), *Instructor in Physical Education; Director, Recreation-Intramurals.*
Martha T. Thorn, M.S. (WVU), *Assistant Professor of Physical Education; Women's Tennis Coach.*
Douglas L. Timmons, M.S. (Ind. St. U.), *Instructor in Safety Studies.*
Patrick A. Tork, M.S. (WVU), *Professor Emeritus of Physical Education.*
James R. Trickett, M.A. (Ind. U., Pa.), *Instructor in Physical Education; Assistant Football Coach.*
Craig Turnbull, M.S. (WVU), *Instructor in Physical Education; Wrestling Coach.*
David VanHalanger, B.S. (WVU), *Instructor in Physical Education; Assistant Football Coach.*
Anthony T. Veltri, M.S. (WVU), *Instructor in Safety Studies.*
David Wanstreet, *Instructor (part-time) in Physical Education.*
Charity W. White, M.S. (WVU), *Associate Professor of Physical Education.*
Mary Katherine Weidebusch, M.A. (WVU), *Associate Professor of Physical Education.*
Robert L. Wiegand, Ed.D. (U. Ga.), *Assistant Professor of Physical Education.*
Bruce W. Wilmoth, M.S. (B. Young U.), *Associate Professor of Physical Education.*
Rachel A. Yeater, Ph.D. (WVU), *Assistant Professor of Physical Education.*
C. Peter Yost, Ph.D. (U. Pitt.), *Professor of Physical Education.*
L. Donald Young, M.S. (WVU), *Instructor in Physical Education; Assistant Football Coach.*
Daniel H. Ziatz, Ph.D. (U. Utah), *Associate Professor of Physical Education.*

Admission

For admission to the School of Physical Education, prospective students must be qualified for admission to WVU and have a grade-point average of 2.0.

Students may be considered for admission to WVU on the basis of graduation and transcripts from accredited high schools. High school graduates are required to present credit for 4 units of English and 1 unit of algebra.

All students entering as first-term freshmen are required to take the American College Testing Program test (ACT) and have the report of scores sent to the University. This test is not used for admission, but for placement, and no other test may be substituted for it.

Students from West Virginia high schools should obtain applications for admission from their high schools. Out-of-state students may write the WVU Office of Admissions and Records and request an application form. Applicants should prepare their part of the application and then return it to their secondary school. The school then will send the completed application and a transcript of high school grades directly to the WVU Office of Admissions and Records.

Students interested in financial assistance must file a Financial Aid Form. Forms are available at the high schools or from the WVU Financial Aid Office. Students must submit forms dated only for the current academic year.

For complete information concerning WVU admission, registration, fees and expenses, and regulations, see Part 2 of the *Undergraduate Catalog*.

Requirements for Physical Education Degrees

The degree of Bachelor of Science in Physical Education may be conferred upon any student who: (1) meets the requirements of the Professional Physical Education Program; (2) offers a minimum of 128 hours; and (3) has a cumulative grade-point average of 2.0.

Professional Physical Education: Required Subjects

Of the 128 hours required for the degree of Bachelor of Science in Physical Education, a minimum number of hours are required in the School of Physical Education. This number is contingent upon the type of program a student pursues.

Teacher Certification Program in Physical Education

The required courses for teacher certification in Physical Education are:

1. Theory and Foundations — P.E. 71, 72, 74, 110 (K-12 only), 121, 125 (K-12 only), 130, 131, 156, 157, 164, 165, 177, 191, 192.
2. Sport and Movement Analysis — Student must complete one of the following tracks:

   Track I —
   a. One course selected from P.E. 51, 61, 62.
   b. One course selected from P.E. 52, 58, 124.
   c. Two courses selected from P.E. 31, 32, 53, 55, 56, 63.
   d. One course selected from P.E. 54, 64.
   e. One course selected from Dance 35, 37, 38, 39.

   Track II —
   a. One course selected from P.E. 51, 61, 62.
   b. One course selected from P.E. 52, 58, 124.
   c. One course selected from P.E. 31, 32, 53, 55, 56, 63.
   d. One course selected from P.E. 54, 64.
   e. Two courses selected from Dance 35, 37, 38, 39.

3. Second Teaching Field and Professional Education — *(See requirements as listed in the College of Human Resources and Education.)*

Certification in Athletic Training

The required courses for certification in Athletic Training are:

1. Physical Education — P.E. 121, 164, 165, 176, 221, 222, 223.
2. Safety Studies — Saf. S. 70.
3. Health Education — Hl. Ed. 70.
4. Biology — Biol. 266.
5. Anatomy — Anat. 102.

In addition the student will complete a first teaching field and professional education requirements. *(See requirements as listed in College of Human Resources and Education.)*

Certification in Athletic Coaching

The required courses for a WVU Athletic Coaching Certificate are P.E. 72, 121, 156, 157, 164, 165.

This certification program is *not* a part of subject-matter specializations approved by the West Virginia Board of Education.

Teacher Certification in Safety Education

The required courses for teacher certification in Safety Education are: Saf. S. 70, 131, 151, 232, 254, 256.

In addition the student will complete a first teaching field and professional education requirements. *(See requirements as listed by the College of Human Resources and Education.)*

Interdisciplinary Emphasis Program

The required courses for the nonteacher certification — interdisciplinary emphasis program — are:

1. *Physical Education* —
   a. Theory and Foundations — P.E. 71, 72, 74, 121, 156, 157, 164, 165, 177, 192, 197.
   b. Sport and Movement Analysis — Requirements are the same as those for teacher certification in physical education.
2. *Second Field* — A second field is to be selected from one of the following areas. Course requirements for each area are listed:
   a. Sport Management — Acctg. 51 and 52, Econ. 51 and 52, B. Law 111, Manag. 105, Mrktg. 111, Fin. 111. Electives — Six hours chosen from any of the following: accounting, business law, economics, finance, management, and marketing. (Student may substitute Math. 28 as an elective.)
   b. Sport Broadcasting — Journ. 18, 19, 182, 183, 189, 228, 284, 285.
   c. Sport Reporting (Newspaper) — Journ. 18, 19, 111, 118, 120, 141, 220, 228.
   d. Sport Social Psychology — Soc. & A. 1, 5, Psych. 1, 2. Electives — Twelve hours chosen from sociology and anthropology and psychology. At least one course must be chosen from each area.

e. Sport Physiology — Chem. 15, 16, Math. 3, 4, Phys. 1, 2, Biol. 266.

General Studies

A student in teacher certification programs will complete general studies requirements as listed in College of Human Resources and Education (Programs for Secondary School Teachers); those in interdisciplinary emphasis programs will complete the University Core Curriculum.

Recommendation for Teacher Certification

The prospective teacher who intends to apply for teacher certification in West Virginia must satisfy the requirements: (1) in physical education, professional education, and a second teaching field; (2) in a comprehensive teacher certification program in physical education, health, and safety, and professional education; (3) in athletic training, first teaching field, and professional education; and (4) in safety education, first teaching field, and professional education.

Teacher certification in physical education is provided for grades K-12 or 7-12. The second teaching field must be chosen from the many and varied teaching specialization programs for elementary and secondary school teachers listed in the College of Human Resources and Education, program area in Curriculum and Instruction.

The student must meet the certification requirements that are in effect at the student's first registration in the teacher preparation program.

For teacher certification, the student shall be responsible for every registration in a course. The grade-point average shall be computed on all work attempted.

Credit Load Per Semester

The minimum work per semester is 14 hours and the maximum work per semester is 20 hours. Exceptions to this regulation are:

An adviser may register a student as a part-time student if less than 14 hours are required to meet all requirements for the bachelor's degree.

Other exceptions to these regulations may be requested by petitioning the Committee on Academic Standards.

Student Petitions

1. Petitions must be submitted to the Committee on Academic Standards: (a) to register for more than maximum hours regularly allowed; (b) to register for less than minimum load; (c) for reentry after academic suspension; (d) to withdraw from courses whenever withdrawal reduces the student's credit-hour load below the required minimum; (e) to withdraw from a course when a student is on academic probation; and (f) to withdraw from a course after the W-WU period is in effect.

2. Petitions should be prepared on special forms and must include the recommendation of the student's adviser.

3. The student may appear in person before the Committee on Academic Standards to support the petition.

4. The student may appeal decision of the adviser and the Committee on Academic Standards to the Dean.

5. The student should submit the petition at an early date. Delay may result in denial.

General Program

The aims of the General Physical Education Program are to develop: (1) an appreciation of the body and its capacity to move; (2) movement skills within the concept of games, sport, dance, and aquatics; (3) an appreciation of the value of continued activity throughout all age periods in an individual's life; (4) an understanding of the cultural significance of sport and dance; and (5) concepts of the physiological characteristics of sport and movement.

The program permits selection of various sport, dance, aquatics, and physical activities. Repeating an activity is now allowed except at a more advanced level.

WVU Health Service will determine whether students are physically qualified to participate in the required physical education program. An individually adapted program, based on the recommendations of the health service, is offered to the student who is unable to participate in the regular required program because of physical handicap.

General Physical Education Requirement

West Virginia University's physical education requirements should be met in the first year of residence. Two hours selected from courses offered by the Department of General Program are required. Physical education majors and transfer students with 58 or more hours are exempt from the requirement. Elementary education majors substitute P.E. 41 and 42 in meeting the two-semester requirement.

Courses of Instruction

Dance

4. *Beginning Ballet.* I, II, S. 1 hr. Simple ballet techniques, positions, basic barre work, and movements of dancing.
5. *Ballroom Dance.* I, II. 1 hr.
6. *Elementary Jazz Dance.* I, II, S. 1 hr. Expressions of feelings through body movement to the jazz dance rhythms.
8. *Beginning Tap Dance.* I, II, S. 1 hr. Simple tap skills, study of basic tap rhythms and fundamentals.
11. *Folk Dance.* I, II. 1 hr.
17. *Elementary Modern Dance.* I, II. 1 hr.
18. *Advanced Modern Dance.* I, II. 1 hr.
35. *Theory and Practice of Modern Dance Techniques.* I, II. 2 hr. Modern dance techniques and rhythmic analysis of movement patterns.
37. *Advanced Dance Techniques with Principles of Choreography.* II. 2 hr. PR: Dance 35. Concentrated study in creative movement problems.
38. *Dance Composition.* II. 2 hr. PR: Dance 35, 37. Problems in force, time, and space as elements of expressive movement.

39. *Folk and Ballroom Dance.* I, II. 2 hr. Folk, square, and ballroom dance forms.

171. *Basic Rhythms and Dance Accompaniment.* II. 2 hr. PR: One semester of modern dance. Basic principles of rhythm as they relate to body movement. *(Ability to play the piano is not required.)*

198. *Special Topics.* I, II, S. 1-3 hr. PR: Consent of department chairperson. Designed to permit in-depth study of theatrical dance forms and production through an innovative course(s) or research or field experiences not included in the major curriculum but as an adjunct to the curriculum.

301. *Rhythms and Dance.* I, S. 3 hr. PR: Graduate standing and consent. Principles of movement, materials, and practicum in dance.

302. *Modern Dance Techniques and Composition.* II, S. 3 hr. PR: Dance 35 and 37 or equiv., graduate standing or consent. Scientific principles of movement; basic principles of music as related to dance movement; choreographic principles; practicum in dance movement. Principles for teaching dance and problems involved in planning program.

303. *American Folk Dance.* I, S. 3 hr. PR: Dance 39 or equiv. American square, contra, circle, and round dance, and their relationships in the arts and aspects of American culture. Analysis of techniques in leading and calling.

304. *History and Philosophy of Dance.* II, S. 3 hr. PR: Dance 302 or equiv. Cultural survey of dance as an expression of the society it represents; philosophy of dance; relation of dance to other art forms; dance as an educational experience.

Physical Education (P.E.)

1, 2. *General Program.* I, II, S. 1 hr. Students select from the following: Adapted Physical Education; Aquatics; Badminton; Billiards; Conditioning; Dance; Figure Improvement; Fitness; Flag Football; Golf; Gymnastics (Men and Women); Handball; Jogging; Martial Arts (Aidido, Karate, Kung Fu, Self Defense); Orienteering; Paddleball, Racquetball; Riflery; Slo Pitch Softball; Snow Skiing; Soccer; Sports Appreciation; Squash; Table Tennis; Team Handball; Tennis; Trampoline; Tumbling; Volleyball; Water Polo; Weight Training; and Yoga.

7. *Archery.* I, II. 1 hr.

11. *Beginning Swimming.* I, II, S. 1 hr. Designed for those who do not swim at all or cannot swim a pool length.

12. *Intermediate Swimming.* I, II, S. 1 hr. Designed for those who have minimal skills in swimming and who wish to improve basic strokes.

16. *Advanced Lifesaving.* I, II, S. 1 hr. PR: Swimming skill. Knowledge and skills for aquatic emergencies. American Red Cross Certification available. *(Swimming skill required.)*

17. *Diving.* I, II, S. 1 hr. Selected dives from the one-meter and three-meter boards in the five diving categories.

18. *Advanced Swimming.* I, II, S. 1 hr. A course to develop rhythm, polish, effectiveness, and endurance in the nine styles of swimming.

19. *Orientation to Scuba.* I, II, S. 1 hr. PR: Advanced swimming skills. A beginning course for those with advanced swimming skills. Includes skin diving, safety practices, physics of diving, and elementary work with self-contained, underwater breathing apparatus.

20. *Canoeing.* I, II, S. 1 hr. Types of canoeing strokes, life-saving techniques for recreational canoeing. *(Swimming skill required.)*

22. *Slimnastics.* I, II, S. 1 hr. Exercises, fitness, weight control, and conditioning activities.

23. *Backpacking.* I, II, S. 1 hr. Knowledge of equipment, maps and compass skills, packing techniques and safety procedures. *(Long hikes and overnight campouts are required.)*

24. *Bowling.* I, II, S. 1 hr. Knowledge and techniques of bowling. *(Not for skilled bowlers.)*

25. *Fencing.* I, II. 1 hr.

31. *Soccer and Track and Field.* I. 2 hr.

32. *Basketball and Softball.* II. 2 hr.

40. *Early Childhood Activities.* I, II, S. 1 hr. For classroom teachers specializing in programs for pre-school and nursery children. Emphasis on motor growth and development patterns, discrimination of basic perceptual factors, and fundamental movements.

41. *Movement Education and Rhythms.* I, II, S. 1 hr. Basic movement skills, games, and simple rhythms appropriate for young children.

42. *Elementary Sports Skills.* I, II, S. 1 hr. Basic skills and lead-up games for children.

43. *Physical Education for Elementary Teachers.* I, II, S. 2 hr. PR: P.E. 41, 42, or consent. Philosophy, objectives, curriculum, and methods of teaching physical education activities for children.

51. *Gymnastics and Volleyball.* I, II. 2 hr.

52. *Aquatics.* I, II. 2 hr. PR: Intermediate swimming or equiv. Exposure to basic strokes, diving, skin and scuba diving, synchronized and competitive techniques, small craft, water safety, and pool maintenance and management.

53. *Soccer and Wrestling.* I, II. 2 hr.

54. *Badminton, Golf, Handball, and Tennis.* I, II, S. 2 hr.

55. *Baseball and Basketball.* I. 2 hr.

56. *Track and Field and Football.* I, II, S. 2 hr. *(Men.)*

58. *Synchronized Swimming.* I, II. 2 hr. PR: P.E. 52 or equiv. Non-competitive and competitive synchronized swimming.

61. *Gymnastics.* I. 2 hr.

62. *Advanced Gymnastics.* II. 2 hr. PR: P.E. 51, 61, or equiv. Advanced skills and techniques in tumbling, regular and special apparatus work, and related areas of gymnastic instruction.

63. *Field Hockey and Volleyball.* I. 2 hr.

64. *Archery, Bowling, and Fencing.* I, II. 2 hr.

68. *Sport Officiating.* II. 1 hr. Study of officiating.

71. *Orientation in Physical Education.* I, II. 2 hr. Introductory study of physical education.

72. *Sociological and Psychological Perspectives of Sport.* I, II, S. 3 hr. Sociological and psychological factors related to man's involvement in sport.

74. *Motor Learning.* I, II, S. 3 hr. PR: Ed. P. 105 or Psych. 1, or consent. Factors influencing motor skill acquisition and their relationship to performance in sport and physical activity.

110. *Elementary Rhythms and Games.* I, II. 2 hr. Rhythmic activities, low organized games, and lead-up games to prepare students for teaching physical education to children.

121. *Sport Injury Control and Management.* I, II, S. 3 hr. Training, conditioning, protection, and other injury prevention measures. First aid, emergency service, and after care related to physical education and athletics.

124. *Water Safety Instructorship.* I, II. 2 hr. PR: Senior Lifesaving Certificate. Teaching methods in swimming and water safety. Meets American Red Cross certification standards. Course completion carries eligibility for teaching swimming, lifesaving, and water safety.

125. *Movement Education for Children.* I, II. 3 hr. PR: P.E. 110. Movement education and its implication for teaching methodology in elementary school physical education. Laboratory work included.

130. *Methods of Teaching Physical Education.* I, II. 3 hr. PR: Junior standing; four courses in sport and movement analysis and Ed. P. 105 and 106. Communication skills involved in teaching physical education in the secondary schools. Emphasizes teaching techniques and methodology. *(Laboratory work included.)*

131. *Program Assisting.* I, II, S. 1 hr. PR: P.E. 130. Laboratory work included.

156. *Principles and Problems of Coaching.* I, II, S. 1 hr. PR: Junior standing. Designed to acquaint students with principles and problems of interscholastic athletic coaching.

157. *Techniques of Coaching.* I, II, S. 2 hr. PR: P.E. 156, Designed to permit students to gain athletic coaching experience through a supervised on-site experience with a varsity athletic team. Laboratory work included. *(This course may be repeated.)*

164. *Kinesiology.* I, II, S. 3 hr. PR: Junior standing. Anatomical, mechanical, and musculoskeletal study of the human body as the instrument for efficient performance of motor activities. *(Laboratory work included.)*

165. *Physiology of Motor Activities.* I, II, S. 3 hr. PR: Junior standing. Human functions under stress of motor activity. *(Laboratory work included.)*

176. *Adapted Program in Physical Education.* I, II, S. 2 hr. PR: P.E. 164 or consent. Organizing and adapting physical education programs to meet the needs of atypical students. *(Laboratory work included.)*

177. *Historical and Philosophical Perspectives of Sport.* I, II, S. 3 hr. PR: Junior standing. The historical antecedents and the philosophical bases of sport as related to society.

191. *Measurement and Evaluation in Physical Education.* I, II, S. 3 hr. PR: Junior standing. Measurement devices and evaluation techniques employed by physical educators. Criteria for test construction and selection, pertinent standardized tests, and the use of statistical models for evaluating test data.

192. *Organization and Administration of Physical Education.* I, II, S. 3 hr. PR: Junior standing. Analysis of administrative and organization principles and processes relating to physical education.

197. *Internship in Physical Education.* I, II, S. 1-3 hr. PR: Senior standing or consent. A student internship in selected schools, businesses, or agencies related to sport.

198. *Special Topics.* I, II, S. 1-3 hr. PR: Consent of Department Chairperson and Dean. In-depth analysis of physical education subject-matter areas through an innovative course(s) or research or field experiences not included in the major curriculum but as an adjunct to the curriculum.

221. *Advanced Athletic Training I.* I. 3 hr. PR: P.E. 164, 165, Saf. S. 70 or consent. An in-depth analysis of preventive measures, injury evaluation techniques, and treatment procedures for athletic injuries. *(Laboratory work included.)*

222. *Advanced Athletic Training II.* II. 3 hr. PR: P.E. 221 or consent. Analysis of management procedures related to athletic training, athletic nutrition, and the epidemiology of athletic injuries. *(Laboratory work included.)*

223. *Athletic Training Practicum.* II. 3 hr. PR: Junior standing. A practical application of athletic training techniques. *(Laboratory work included.)*

225. *Program Planning of Recreational Sport.* I, II, S. 3 hr. PR: Graduate standing or consent. An in-depth study of recreational sport programs, including philosophy, objectives, program development, management concepts, and evaluation.

300. *Workshop in Physical Education.* I, II, S. 1-15 hr.

305. *Philosophical Concepts in Physical Education.* I, S. 3 hr. PR: Graduate standing or consent. Study of educational philosophies and application of these philosophies to physical education; study of the place of physical education in education and modern living.

315. *Research Methodology in Physical Education.* I, S. 3 hr. PR: Graduate standing or consent. Application of historical, descriptive, and experimental research strategies and designs to physical education.

320. *Individual Interaction in Sport and Physical Activity.* I, S. 3 hr. PR: Graduate standing or consent. Designed to acquaint the student with the reciprocal relationships between sport and physical activity and the societies and cultures out of which sport emerges.

340. *Psychology of Sport and Physical Activity.* I, S. 3 hr. PR: Graduate standing or consent. Psychological effects and implications of man's participation in sport and physical activity. Emphasis on the personality and motivational dynamics of sport involvement.

345. *Group Influences in Sports.* I. 3 hr. PR: Research, Statistics, P.E. 320, 340. The manner and degree to which selected psychological processes of individuals are affected by involvement in sports.

360. *Biomechanical Analysis of Sport and Physical Activity.* II, S. 3 hr. PR: P.E. 164 and 165 or equiv., or consent. Advanced principles of body mechanics and analysis of muscle and joint actions in coordinated movement and neuromuscular physiology.

365. *Psychomotor Behavior Analysis.* II, S. 3 hr. PR: Graduate standing or consent. In-depth study of psychomotor learning with emphasis on behavioral change in physical activity. Review of research and psychological thought pertinent to motor learning, performance, and physical activity.

367. *Theories of Sport Physiology.* I, S. 3 hr. PR: Doctoral standing. Thorough and workable knowledge of principles involved in the interactions of muscles and nerves, reflexes, metabolism, cardiopulmonary function, environmental physiology, and the practical application of work physiology.

380. *History of Sport and Physical Activity.* II, S. 3 hr. PR: Graduate standing or consent. Anthropological and historical approach toward the influence of events, political and social climates, and personalities upon the sport cultures from early civilizations to the present.

Safety Studies (Saf. S.)

70. *First Aid and Emergency Care.* I, II, S. 3 hr. Emergency aid for the sick and injured. Emergency services aimed at reducing the potential of permanent disability or threats to life, as well as pain, damage, or suffering of less serious nature.

131. *Accident Prevention and Control Principles.* I, II, S. 3 hr. Basic course which structures principles, concepts, and methodology of the safety movement into introductory experiences dealing with accident prevention and control efforts recommended for various social institutions and agencies.

151. *Driver and Highway Safety Fundamentals.* II, S. 3 hr. PR: Saf. S. 131 or consent. Basic course for individuals who will provide instruction for beginning drivers which emphasize essential content, methods, and desirable practices for both classroom and laboratory applications.

231. *Safety in Motor Transportation Services.* II. 3 hr. PR: Saf. S. 131 or consent. Safety elements of automotive transportation equipment. Design, operation, planning, and control plus effects of legislation. The school motor fleet is highlighted.

232. *Safety Education Principles and Content.* I. 3 hr. PR: Saf. S. 131 or consent. Study and analysis of content areas usually recommended for instructional programs within the field of safety, with emphasis on structured learning experiences.

254. *Teaching Driver and Highway Safety.* S. 3 hr. PR: Saf. S. 151 or equiv. and valid driver license. Teaching and coordinating driver and highway safety education in schools. Arranged laboratory assures practice in providing behind-the-wheel instruction to beginning drivers.

256. *Driver and Safety Instructional Innovations.* II, S. 3 hr. PR or Conc.: Saf. S. 151 and 254. Multimedia, multivehicle, simulation, and other innovations for classroom and laboratory instruction applied to driver and safety education as revealed by research and current literature.

291. *Special Topics.* I, II, S. 2-6 hr. PR: Consent. Consideration of persistent issues and changing problems in the safety field. Seminar emphasis extends considerable attention to safety interests of participating class members.

300. *Contemporary Safety Beliefs and Foundations.* II, S. 3 hr. Philosophies of the safety movement as expressed by leaders in the field are related to accident causation, accident prevention, and research implicatons.

310. *Controlling Environmental and Personnel Hazards.* I or II, S. 3 hr. PR: Saf. S. 300 or consent. Investigation of hazard control principles relating to environmental facilities and equipment including control procedures recommended by authorities from the fields of engineering, medicine, and public health, as well as from the field of safety.

311. *Accident Countermeasures for Human Factors.* I or II, S. 3 hr. PR: Saf. S. 300 or consent. Investigation of concepts dealing with human behavior as related to accident experience in major reporting categories with consideration of psychological, sociological, and health implications.

330. *Health Hazard Loss Control Management.* I, II. 3 hr. PR: Consent. Safety manager utilization of public health, legislative, industrial hygiene, engineering, medical, nursing, and education resources designed for identifying, controlling, and minimizing occupational health hazards and related losses.

333. *Disaster Preparedness and Emergency Systems.* I or II, S. 3 hr. PR: Saf. S. 300 or consent. Major elements involved in disasters and emergencies, preparedness planning, systems utilization, and attention to essential human services, with emphasis on community action.

334. *Establishing and Managing Fire Services.* I or II, S. 3 hr. PR: Saf. S. 300 or consent. Analysis of fire services usually provided under safety manager jurisdiction, with special attention to legal bases, organizational structure, services rendered, training needs, and management techniques.

335. *Safety Legislation and Compliance Operations.* I, S. 3 hr. PR: Saf. S. 300 or consent. Comprehensive study and analysis of federal and state legislation which mandates compliance with certain safety conditions and practices related to work performed in occupational and comparable settings.

336. *Safety and Loss Control Management.* I, S. 3 hr. PR: Saf. S. 300 or consent. Management guidelines, functional standards, and operational features applicable to safety and loss control programs designed for business, governmental, industrial, and educational enterprises.

339. *Security Management Practices and Problems.* I or II, S. 3 hr. PR: Saf. S. 300 or consent. Safety manager responsibilities for security of persons and property including organizational patterns, personnel competencies expected, surveillance and monitoring methods, and occupational problems among security personnel.

School of Social Work

The School of Social Work undergraduate program is a part of a comprehensive program of professional education in social work including degree programs at the baccalaureate and master's levels, a range of part-time and continuing educational opportunities on and off the Morgantown campus, and the international social worker exchange program — sponsored jointly by the Department of State and the Council of International Program for Social Workers and Youth Leaders, Inc.

Social work, one of the oldest human service professions, is based upon social and behavioral science information which is used to understand and provide the basis for helping individuals, groups, and communities. Social work is concerned with helping people to be more effective in their relations with the institutions of society. Social workers assist people in accomplishing life goals and realizing their potential. Three major purposes of social work are:

1. To enhance the problem-solving, coping, and developmental capacities of people.
2. To promote the effective and humane operation of the systems that provide people with resources and services.
3. To link people with systems that provide them with resources, services, and opportunities.

In carrying out these purposes, social workers, working with other professionals, participate in helping to solve problems associated with financial need, social and cultural deprivation, racial injustice, physical and mental illness, disadvantaged children, troubled youth, disturbed family relationships, and aging.

One of the goals of the undergraduate program is to educate a cadre of people who assist in easing the burden of the poor and the disenfranchised in West Virginia and the Appalachian region. Such people are needed to work in the hollows, small towns, and cities to help meet human needs.

The demand for bachelor's-level social workers is high. They traditionally provide direct services to those who need them. There is a critical shortage of such qualified, well-trained, social work personnel — people who assist human renewal and who get involved.

There are increasing opportunities for employment in West Virginia and the Appalachian region with such agencies as child and public welfare departments, the courts, nursing homes, hospitals, family counseling agencies, senior citizen agencies, mental health agencies, legal service agencies, and juvenile treatment centers.

Faculty

Ralph E. Nelson, Ph.D. (U. Minn.), *Acting Dean and Professor.*
Sung L. Boo, Ph.D. (Fla. St. U.), *Coordinator of Undergraduate Program and Professor.*
Roger Lohmann, Ph.D. (Brandeis U.), *Coordinator of Graduate Studies and Research and Associate Professor.*
Betty L. Baer, M.S.W. (Syracuse U.), *Director of National Project on Undergraduate Social Work Curriculum Development and Associate Professor.*
Ernest J. Barbeau, M.S.W. (U. Pitt.), *Assistant Professor.*
Minza K. Boo, M.S.W. (Howard U.), *Instructor.*
Marjorie Buckholz, Ph.D. (NYU), *Professor.*
Patty Gibbs, M.S.W. (WVU), *Instructor.*
Anita S. Harbert, Ph.D. (Brandeis U.), *Associate Professor.*

Hilda Heady, M.S.W. (WVU), *Instructor.*
Larry Icard, M.S.W. (WVU), *Assistant Professor.*
John F. Isaacson, M.S.W. (U. Penn.), *Associate Professor.*
Preston Jones, Jr., Ed.D. (WVU), *Assistant Professor.*
Robert Jones, M.S.W. (WVU), *Assistant Professor.*
Raymond Leinbach, M.S.W. (Rutgers U.), *Assistant Professor.*
Barry L. Locke, M.S.W. (Va. Comwlth. U.), *Assistant Professor.*
Nancy Lohmann, Ph.D. (Brandeis U.), *Associate Professor.*
Edna McCutcheon, M.S.W. (WVU), *Instructor.*
John J. Miller, Ed.D. (WVU), *Professor.*
John A. Peters, M.S.W. (WVU), *Assistant Professor.*
Robert A. Porter, Ph.D. (Brandeis U.), *Professor.*
Jane Riffe, M.S.W. (U. Ky.), *Instructor.*
Victor L. Schneider, Ph.D. (U. Mich.), *Professor.*
LeRoy G. Schultz, M.S.W. (Wash. U., St. Lou.), *Professor.*
Neil R. Snyder, Ph.D. (U. Pitt.), *Associate Professor.*
Elaine Thomas, M.S.W. (Hunter C.), *Assistant Professor.*
Carroll Wilkinson, M.L.S. (Rutgers U.), *Research Assistant.*
Harold R. White, M.S.W. (SUNY — Buffalo), *Associate Professor.*
Susan Young, M.S.W. (WVU), *Visiting Assistant Professor.*

Program Objectives

Undergraduate preparation for social work is best accomplished within the framework of a broad liberal arts curriculum. With proper selection from the regular course offerings in the University Core Curriculum and social and behavioral sciences, the student will be provided with general knowledge advantages as preparation for direct entry into social work practice at the baccalaureate level.

The School of Social Work undergraduate program has as its primary goal the preparation of professional social workers. Since the program is located within the state's land-grant institution, it has a particular mission to prepare social workers who can practice effectively in West Virginia and the Appalachian region. Therefore, practice in nonmetropolitan areas is emphasized.

The purpose of the baccalaureate social work program is described in four interrelated objectives:

1. To prepare the student to be an effective and responsible social work practitioner at the baccalaureate level of competency and a leader in relation to the demands of the social work profession.

2. To prepare the student to be a social work practitioner who can practice with entry-level professional competencies in West Virginia and the Appalachian region.

3. To contribute to the enrichment of the general curriculum of WVU by providing opportunities for students to increase their sensitivity, knowledge, and understanding of human needs, social problems, and social welfare issues.

4. To prepare the student — who may be interested — for entrance into graduate-level education in the School of Social Work, other graduate social work programs, or other graduate programs.

Accreditation

The WVU undergraduate social work program is accredited by the Council on Social Work Education and its students are accepted, on completion of requirements for the degree of Bachelor of Science in Social Work, by the Na-

tional Association of Social Workers for regular membership in the association.

Admission

Initial application to WVU should be submitted to the Office of Admissions and Records and should follow the same procedure as for all other freshman students.

Freshmen and sophomores who are considering social work as a major should consult the College of Arts and Sciences' Academic Advising Center for help in planning their program.

To elect social work as a major, a student must meet the following criteria:

1. Have successfully completed 58 hours of course work.
2. Have satisfactorily completed So. Wk. 51 (Introduction to Social Work) with a grade of "C" or higher. So. Wk. 51, which is usually taken during the sophomore year, provides the student with an opportunity to assess interest in an aptitude for a career in social work.
3. Have an overall grade-point average of 2.0 or higher (on a 4.0 scale).

Other students, including transfer students, who are interested in social work as a major should communicate directly with the School of Social Work. These students will be provided with an on-campus interview where an assessment of their interest will be made. Students are expected to provide a current transcript and additional material which would support their admission to the major. (In some instances it may be deemed necessary for the student to enroll in So. Wk. 51 before being admitted to the social work major.)

For complete information concerning WVU admissions, registration, fees and expenses, and regulations, see Part 2 of the *WVU Undergraduate Catalog.*

Requirements for the Degree

The undergraduate program consists of a minimum of 33 upper-division semester hours in social work; a minimum of 12 upper-division semester hours in *required* social and behavioral sciences courses; and a minimum of 12 upper-division semester hours in *recommended* courses from the social and behavioral sciences area. In addition, social work students are required to take a minimum of 6 semester hours in course work dealing with racial and other minority groups — from a group of courses designated by the undergraduate program. A total of 128 hours is required for the degree, of which 58 must be in upper-division course work.

No foreign language is required. The student is encouraged to consult with the adviser regarding selection of electives appropriate for individual career interests.

To establish a major sequence and to qualify for graduation, the student must have spent at least two semesters and have accumulated a minimum of 30 semester hours as an upper-division student in the department of the student's major, or under its guidelines. Students must have completed all required social work courses with grades of C or better.

The specific requirements of study are:

University Core Curriculum —	*Hr.*
English Composition	6
Physical Education	2
Core Group A	12
Core Group B	12
Core Group C	12
Total	44

(In the Core Curriculum, students should take the following: Psychology 1, Sociology and Anthropology 1 or 7, Economics 51, Political Science 1 or 2, and Biology 1, 2, or Nutrition 71.)

Social and Behavioral Science Required Courses —

Psychology 141 — Introduction to Human Development	3
Sociology and Anthropology 121 — The Family	3
Sociology 211 — Social Research Methods	3
Political Science 120 — State and Local Government	3
	12

Social and Behavioral Science Recommended Courses
(At least one course from each area)

(1) Psychology 151, 164, 279, 281	
(2) Sociology and Anthropology 122, 140, 204, 223	12
(3) Political Science 135, 140	

Social Work Required Courses —

Lower Division	
Social Work 51 — Introduction to Social Work	3
Upper Division	
Social Work 200 — Social Welfare Policy and Services	3
Social Work 210 — Social Welfare Policy and Services in Appalachia	3
Social Work 220 — Social Work Methods I	3
Social Work 222 — Social Work Methods II	3
Social Work 280 — Seminar	3
Social Work 290 — Social Work Practice I	9
Social Work 291 — Social Work Practice II	9
	36
Minority Content Requirements	6
Electives	18
TOTAL	128

The student who wishes to enter in the social work program should contact the School of Social Work office in 710 Allen Hall for assistance in planning and for additional information. Freshman and sophomore students who are considering social work as a major should consult with the College of Arts and Sciences Academic Advising Center pre-social work advisers for help in planning their programs.

Field Experience Requirements

Field experience is a key component of the student's total educational experience in the undergraduate program. Through the field experience program, students "test out" in actual social work service-providing activities their abil-

ity to utilize and apply the knowledge, values, and skills which have been acquired through previous course work, the concurrent social work practice seminar, and other life experiences.

Students are assigned for these activities for two semesters during their senior year to a social welfare organization or agency in Monongalia and surrounding counties which meet the criteria for participation in the Field Experience program. This experience requires the student to spend 16 hours a week in the organization (at least 532 clock hours total for both semesters).

To successfully complete requirements for graduation, students must demonstrate, through educationally-focused field experience activities, those practice competencies (i.e. combination of social work knowledge, values, and skills) which have been identified as suitable and necessary for entry into professional social work practice.

The field experience placements, and supervisors, are:

American Red Cross
316 Forest Ave.
Morgantown, WV 26505
Jennifer Goldenson

Blacksville Women's Information Cen.
Clay-Battelle Health Clinic
Blacksville, WV 26521
Hilda Heady and Reba Thurmond

Central District Mental
Health Center, Inc.
6 Hospital Plaza
Clarksburg, WV 26301
Rita Boyle

CRISP
603 E. Brockway Ave.
Morgantown, WV 26505
Denny Regele,* Sandy Perine

Foreign Student Office
Moore Hall
West Virginia University
Morgantown, WV 26506
Barbara Alvis

Harrison County Information and
Referral Service
Box 1831, 150 W. Main St.
Clarksburg, WV 26301
Anne Terrenzi*

Head Start
101 Wilson Ave., Annex II
Morgantown, WV 26505
Betty Evans*

MonVac
160 Fayette St.
Morgantown, WV 26505
Marjorie Miller, Terri Pervola,
Martha Olson

Morgan Manor Convalescent Center
Route 11, Box 440
Morgantown, WV 26505
Antonia Gainer

North Central West Virginia
Legal Aid Society
155 Walnut St.
Morgantown, WV 26505
Allan N. Karlin, Peggy Hughes, all staff

PACE
Box 4241
Morgantown, WV 26505
Steve VanderPoel

Preston County Child Abuse Placement
c/o W. Va. Department of Welfare
304 Kingston Rd.
Kingwood, WV 26537
Sue Arnold

Probation Office
Monongalia County Court House
Morgantown, WV 26505
Marcia Pops, Tony Barill,
Meredith Jones

Rape and Domestic Violence
Information Center
3051 VanVoorhis Rd.
Morgantown, WV 26505
Susan Swala*

Rock Forge Neighborhood House
Box 3042, Sabraton Station
Morgantown, WV 26505
Glenna Williams,* James Mohrman,
Frankie Cline

Shack Neighborhood House
Pursglove, WV 26546
Charles Eble

Southwestern Monongalia County
Senior Center
Everettville, WV 26533
Patricia Hicks

Special Children's Clinic
440 VanVoorhis Rd.
Morgantown, WV 26505
Beverly Burgess

Sundale Rest Home
449 VanVoorhis Rd.
Morgantown, WV 26505
Pam Corley

United Methodist Child Placement Services
Box 2515
Fairmont, WV 26554
Phyllis L. Harvey

United Peoples Welfare Rights Organization
440 Madison St.
Fairmont, WV 26554
Michael C. Toothman,* Jesse L. Lawson, Beth Bartlett, and Amy Parks

Valley Community Mental Health Center
603 E. Brockway Ave.
Morgantown, WV 26505
Bob Musick*

West Virginia Dept. of Welfare, Area #3
1401 Country Club Rd.
Fairmont, WV 26554
Nancy Corrothers*

West Virginia Dept. of Welfare, Area #9
5 Harman Center
Grafton, WV 26354
Patricia Chase

Weston Hospital
Weston, WV 26452
Richard Lockhart, Robert Allison,* and Jane Clay

Women's Information Center
221 Willey St.
Morgantown, WV 26505
Reba Thurmond

W. Va. Department of Welfare, Area #8
431 W. Pike St.
Clarksburg, WV 26301
Ann Groves and Janice Trumble

WVU Placement Service
Mountainlair
West Virginia University
Morgantown, WV 26506
Frank G. Carney

Youth Attention Center
Monongalia County Court House
Morgantown, WV 26505
Marcia Pops and Joe Santos

YWCA-WVU
719 College Ave.
Morgantown, WV 26506
Ellen A. Morris

Catholic Community Services
227 Chestnut St.
Morgantown, WV 26505
Judy Wilhelm

In-Touch and Concerned, Inc.
807 Monongahela Bldg.
Morgantown, WV 26505
Candice Snyder Gutierrez

*Indicates members of Field Experience Advisory Committee.

Courses of Instruction in Social Work (So. Wk.)

51. *Introduction to Social Work.* 3 hr. Social work and the profession. The helper and the kinds of problems and situations with which the helper may become involved are explored. *(Open to sophomores.)*

200. *Social Welfare Policy and Services.* 3 hr. PR: So. Wk. 51 or consent. Introduces the student to the historical background and philosophical concepts which influence the development of social welfare in America. Students are exposed to the specific social welfare programs and services utilized by the people.

210. *Social Welfare Policy and Services in Appalachia.* 3 hr. PR: So. Wk. 200, 300, or consent. This course builds upon the content of So. Wk. 200 by focusing in greater detail on the process of defining social problems, developing social policies, and implementing social provisions in the Appalachia region.

220. *Social Work Methods I.* 3 hr. PR: So. Wk. 51 or consent . Theories and concepts of intervention, including prevention and rehabilitation with individuals, families, small groups, and communities. Students examine problem areas of concern to social work and various roles through which those problems can be alleviated. Emphasis on beginning skills in interviewing, observing, recording, problem identification, and analysis.

221. *Field Experience in Social Work.* 3 hr. PR: So. Wk. 200 or consent. Development of basic helping skills are developed through a supervised volunteer or work experience in a community agency or program. *(Open to selected nonmajors).*

222. *Social Work Methods II.* 3 hr. PR: So. Wk. 200, 220. Students examine a variety of approaches to intervention, prevention, and rehabilitation in current programs such as community action, model cities, comprehensive community mental health, organized population groups, services of departments of public welfare, extension, etc.

280. *Seminar.* 1-6 hr. PR: Consent. Current issues in social work. Independent study with weekly seminar. Seminars in human sexuality, poverty and income security, physical and mental health, racism, children and family, women, aging, and delinquency. *(Inquire at Social Work office for other current offerings.)*

290. *Social Work Practice I.* 9 hr. PR: So. Wk. 210, 222. Integrates social work practice knowledge, skills, and values learned in previous learning experiences into the development of competencies of social work practice. *(Two days field experience are taken concurrently with the practice seminar.)*

291. *Social Work Parctice II.* 9 hr. PR: So. Wk. 290. Continuation of So. Wk. 290.

Part 4
INTERDISCIPLINARY PROGRAMS
African Studies

Since 1967, the University has expanded its technical and academic competence regarding Africa from solely the agricultural sciences to include the social sciences and humanities. The Colleges of Agriculture and Forestry, Arts and Sciences, Business and Economics, Engineering, Human Resources and Education, and the Creative Arts Center, are involved in teaching and research in African and Africa-related subjects.

The Committee on African Studies was organized in 1969, in cooperation with the WVU Office of International Programs, to fulfill two basic requirements: (1) to blend the agricultural expertise of long standing with the newer programs of study and research into unified course offerings and systematic research; and (2) to make available, to existing and prospective University programs of African technical assistance, knowledge in the social sciences and the arts.

Moreover, it is within the committee's mandate to broaden its activities to include other parts of the world experiencing problems of development and human change similar to those of Africa. Although WVU programs have been related significantly to East Africa, they have a wider application. The concepts and philosophy developed in all of these activities can be utilized throughout Africa and, with suitable modification, could benefit other developing areas of the world, including the Appalachian region.

The Africana library collection contains approximately 7,000 volumes, exclusive of periodicals, and is capable of supporting undergraduate and graduate research up to and including the doctoral level within several natural and social sciences.

The committee does not offer undergraduate or graduate degrees in African studies as such, but rather stimulates, in students who are formally associated with departments in the natural and social sciences and the humanities, the interdisciplinary study of Africa, and development.

In 1970, the graduate program in public administration was expanded to include an option in development administration. The effect of this is to ally the Committee on African Studies and its curriculum with the Department of Public Administration M.P.A. Program. Students completing the option are awarded the M.P.A. degree with an interdisciplinary concentration in the area of African and development studies.

The committee provides opportunities for special nondegree study in African-related subjects and works to develop international study programs in Africa for University faculty and students.

Further information concerning the African Studies program may be obtained from: Rodger D. Yeager, Coordinator, Office of International Programs, 2112 Agricultural Sciences Building.

Associated Faculty and Staff

Rodger D. Yeager, Ph.D. (Syracuse U.), *Coordinator, Office of International Programs; Associate Professor of Political Science; Coordinator, African Studies.*
Vance Q. Alvis, Ph.D. (U. Va.), *Professor of Economics*
Gerald C. Anderson, Ph.D. (U. Mo.), *Professor of Animal Science.*
P. Vernon Armbrester, M.S. (WVU), *Associate Dean, College of Agriculture and Forestry; Associate Professor of Agricultural Education.*
Wesley M. Bagby, Ph.D. (Columbia U.), *Professor of History.*
Newton M. Baughman, Ph.D. (Purdue U.), *Professor of Plant Science.*
Joy U. Berkley, M.A. (WVU), *Assistant Professor of English.*
Philip Bordinat, Ph.D. (U. Birmingham, Eng.), *Professor of English.*
Thomas C. Campbell, Jr., Ph.D. (U. Pitt.), *Professor of Economics.*
Edmond B. Collins, M.S. (WVU), *Professor of Agricultural Engineering.*
Robert S. Dunbar, Jr., Ph.D. (Cornell U.), *Professor of Animal Science.*
Philip J. Faini, M.M. (WVU), *Professor of Music.*
Mannon E. Gallegly, Ph.D. (U. Wisc.), *Professor of Plant Pathology.*
Henry W. Hurlbutt, Ph.D. (U. Md.), *Professor of Biology.*
Marvin R. McClung, Ph.D. (Iowa St. U.), *Professor of Animal Science.*
Robert M. Maxon, Ph.D. (Syracuse U.), *Associate Professor of History.*
Robert H. Maxwell, Ph.D. (Cornell U.), *Professor of Resource Management.*
Paul G. Moe, Ph.D. (Rutgers U.), *Professor of Soil Microbiology.*
Robert F. Munn, Ph.D. (U. Mich.), *Dean of Library Services; Chairman and Professor of Library Science.*
Ralph E. Nelson, Ph.D. (U. Minn.), *Professor of Agricultural Economics; Vice-Provost — Academic Affairs.*
Franklin Parker, Ed.D. (Geo. Peabody C.), *Claude Worthington Benedum Professor of Education.*
Charles B. Sperow, Jr., M.S. (WVU), *Professor of Agronomy.*
Willem A. van Eck, Ph.D. (Mich. St. U.), *Professor of Agronomy.*
James A. Welch, Ph.D. (U. Ill.), *Professor of Animal Science.*
Frank E. Woodson, D.V.M. (Ohio St. U.), *Professor of Veterinary Science.*
Dale W. Zinn, Ph.D. (U. Mo.), *Dean, College of Agriculture and Forestry; Professor of Animal Science.*

African and Related Undergraduate Courses of Study

College of Agriculture and Forestry

Agriculture 90 — Man and Food

College of Arts and Sciences

Department of English

English 185 — Introduction to Contemporary African Literature
English 286 — Black American Fiction

Department of Foreign Languages

Swahili 1, 2 — Elementary Swahili
Swahili 3, 4 — Intermediate Swahili

Department of Geology and Geography

Geography 143 — Geography of Africa

Department of History

History 227 — East Africa to 1895
History 228 — East Africa Since 1895
History 229 — History of Africa: Pre-Colonial
History 230 — History of Africa: European Dominance to Independence
History 251 — History of Black People in America to 1900
History 252 — History of Black People in America Since 1900

Department of Political Science

Political Science 258 — Politics of Africa
Political Science 351 — Politics of Planned Development

Department of Sociology and Anthropology

Sociology and Anthropology 131 — Urban Sociology
Sociology and Anthropology 156 — African Society and Culture
Sociology and Anthropology 223 — Sociology of Rural Life
Sociology and Anthropology 240 — Social Change
Sociology and Anthropology 241 — Population Dynamics
Sociology and Anthropology 251 — Cultural Dynamics
Sociology and Anthropology 290 — Special Topics

College of Business and Economics

Economics 213 — Economic Development

Creative Arts Center

Divison of Music

Music 230 — Music of Africa

Center for Extension and Continuing Education

The pioneers in the land-grant movement intended to establish institutions through which knowledge and learning would become an effective part of the daily lives of the American people. West Virginia University is such an institution.

The Center for Extension and Continuing Education conducts: (1) educational programs of an informal, nonresident, problem-oriented nature, and (2) off-campus classes for credit and noncredit. In the role of conducting informal educational programs, the Center interprets, disseminates, and encourages use of knowledge. But its responsibilities are much broader than that — it is also an agency for change, a catalyst for individual and group action. It has a responsibility to conduct programs of education for action and to stress organizational and educational leadership.

To effectively fulfill its educational mission, the Center is organized to carry out its work through: (1) campus-based program divisions, (2) area offices, and (3) county program units. The Center's staff is supported by the various colleges and schools of the University, and by Science and Administration-U.S. Department of Agriculture, with subject matter and overall objectives. Financing comes from state appropriations, federal funds, county courts, and county boards of education.

The county staffs, area offices, and state program divisions have important functions to perform in developing the work of the Center. The county staff in-

volves local people in determining needs, identifying problems, establishing priorities, and developing programs. This function is carried out with full participation by state and area staffs. In addition, an important part of the program planning process is the inclusion of knowledge from the state program division staffs that can affect the evolvement of programs at the county or multicounty level.

Division of Social and Economic Development

The Division of Social and Economic Development offers research and educational programs providing information intended to further the social and economic development of West Virginia. The division includes Business Extension, Clergy and Cultural Education, Fire Service Extension, the Institute for Labor Studies, the Office of Research and Development, and the Water Research Institute.

The Business Extension program is conducted in cooperation with the College of Business and Economics. This program offers educational activities designed to meet the management information needs of both public and private enterprises.

Programs aimed at meeting church and community leadership needs of the clergy and cultural education programs concerned with West Virginia's cultural heritage are offered by Clergy and Cultural Education.

Training for West Virginia's fire fighters is offered by Fire Service Extension. The fundamentals of fire suppression are taught in basic, advanced, and regional schools conducted throughout the state. In addition to fire suppression training, programs for fire department officers and instructor training programs for training officers and field instructors also are offered. A training center located in Morgantown provides facilities for fire-training and fire-extinguishment research.

The Institute for Labor Studies conducts educational and research programs for workers and their organizations. Subject matter ranges from skill courses, such as steward training, collective bargaining, work measurement, union administration, job evaluation, and contract administration, to a liberal arts curriculum covering such subjects as labor and economy, government and society, and labor history. Research ranges from collective bargaining studies, to attitude surveys, to economic analyses.

The Office of Research and Development designs and conducts interdisciplinary research concerned with the social and economic problems of the state and provides evaluation research services for University, state, and private agencies.

The Water Research Institute program is designed to obtain knowledge needed to gain the greatest benefit from the water resources of West Virginia. Research involving faculty members and graduate students is done on projects centered in several departments of WVU.

Division of Agriculture, Forestry, and Community Development

The Division of Agriculture, Forestry, and Community Development has five structured program units: Animal Sciences, Plant Sciences, Forestry, Resource Management, and Community Development. Each program unit con-

ducts educational programs and provides technical assistance to enhance rural development in West Virginia.

The division's primary objective is to collect, translate, and diffuse knowledge to clientele that has been generated within WVU and similar institutions and organizations in West Virginia and neighboring states. Many opportunities exist for students to support local program activities in a variety of subject-matter areas.

Areas of specific interest to the division in pursuit of its educational objectives are: (1) improvement of animal and crop production through breeding and management; (2) improvement of pasture and forage production levels; (3) proper utilization of land and conservation of land and natural resources; (4) economical weed and pest control techniques; (5) environmentally and economically sound forestry production, harvesting, and utilization schemes; (6) maintenance of air and water quality; (7) expansion of animal and solid-waste management programs; (8) expanded outdoor recreation and tourism programs; (9) improvement of the leadership and decision-making capabilities of adult and youth community groups, organizations, agencies, and public officials to enhance their efforts to secure better housing, transportation, social services, water and sewage systems, recreational facilities, and local government; (10) energy conservation; and (11) more complete identification of resources available for community and rural development.

Division of 4-H — Youth Development

The overall mission of the 4-H — Youth Development Division in conducting its programs is the development of youth individually and as responsible and productive citizens. The programs provide opportunities for development through organized 4-H clubs, 4-H Special Interest Groups, 4-H TV Clubs, camps, and some individual approaches.

The "learning to do by doing" approach has, since the inception of 4-H, been largely accomplished through the individual project. Youth may choose from more than 100 different projects to select one or more to meet their needs and interests. Project offerings include photography, electricity, all phases of agriculture and home economics, forestry, conservation, entomology, handicrafts, bicycling, safety, and many more. The project concept has broadened to include group projects such as fire fighting.

Special interest groups provide an opportunity for young people to participate in a sustained educational learning experience on a topic vital to them but not necessarily to become involved in an organized club. Automotive safety is an example.

Education through camping is one of the major thrusts of the division. In addition to one or more week of county 4-H camps being conducted annually in each county, special interest camps are conducted which include areas such as self-understanding, career development, cultural heritage, citizenship, community development, recreation, junior leadership, opportunity camps, and others.

A special 4-H educational program focusing on career development is conducted in two urban areas; another provides food and nutrition education for disadvantaged youth in eleven densely populated areas; and a third special program on 4-H/Community Development is conducted in rural areas of the state.

Leadership at the local community level is provided by adult and teen volunteers. An in-depth leadership development program is in progress.

Division of Off-Campus Credit and Continuing Education Programs

This division coordinates the WVU graduate and undergraduate off-campus course offerings and the Continuing Education Unit (CEU) Program.

Undergraduate Courses

Generally, WVU offers undergraduate-level, off-campus courses for credit only in specific situations where expressed needs cannot be met by local undergraduate colleges. Such courses normally are offered on a contractual basis. Fees for undergraduates are $11.00 per credit hour for West Virginia residents and $54.00 per credit hour for nonresidents.

For further information, write to: Division Leader for Off-Campus Credit Programs, Knapp Hall, West Virginia University, Morgantown, WV 26506.

Graduate Courses

Approximately 180 graduate-level off-campus courses are offered each semester through the WVU graduate centers located at Jackson's Mill, Parkersburg Community College, Potomac State College, Shepherd College, and West Liberty State College. Course offerings are designed to enable students to fulfill the requirements of specified master's degree programs.

Master's programs available through the centers are reading, secondary classroom teacher, education administration, elementary classroom teacher, early childhood education, and special education. Courses offered are approved by the appropriate department chairperson and academic dean and by the Division Leader for Off-Campus Credit Programs. Graduate-level courses also are approved by the Graduate School Dean.

Students taking off-campus courses for graduate credit must satisfy all requirements for admission to the University and, before registering, must file with the WVU Dean of Admissions and Records complete official transcripts of record. It is the responsibility of students to ascertain from the appropriate college and department the specific requirements for degree candidacy.

Fees for off-campus graduate-level courses are $16.00 per credit hour for West Virginia residents and $73.00 per credit hour for nonresidents.

Library Resources

Library and laboratory facilities for off-campus courses must be approved by the Division Leader for Off-Campus Programs and, in case of courses for graduate credit, by the Graduate School Dean. Books for use by off-campus students may be borrowed from the WVU Library upon the order of the Division Leader for Off-Campus Credit Programs, subject to the approval of the Library Committee, Postal charges must be paid by the individual or groups for whom the books are borrowed.

Continuing Education Unit Program

Recognizing the importance of continuing education, WVU has adopted the Uniform Measurement System recommended by the national task force coordinated by the National University Education Association. The Continuing Education Unit (CEU) may be used for the measurement, recording, accumula-

tion, transfer, and recognition of participation by adults in programs which seldom in the past have been recorded in a systematic way or with any sense of permanence, significance, or transferability. The unit can be applied with equal facility to professional continuing education, vocational retraining, and adult liberal education, as well as all other programs in adult and continuing education. The assignment of Continuing Education Units to a WVU-sponsored educational activity is the responsibility of the Council for Off-Campus Education.

For further information, write to: Division Leader for Off-Campus Credit Programs, Knapp Hall, West Virginia University, Morgantown, WV 26506.

Division of Personal and Family Development

The goal of the Division of Personal and Family Development is to help West Virginia families identify needs, make decisions, and utilize resources to improve their quality of living. Programs include information on managing a home; providing nutritious, safe, and attractive meals; improving personal and community relationships, and leadership skills; providing a safe and attractive home environment; managing family resources; and planning and caring for clothing.

Oak Ridge Associated Universities

West Virginia University is one of the sponsors of Oak Ridge Associated Universities (ORAU), a nonprofit education and research management corporation of 43 colleges and universities. ORAU, established in 1946, conducts programs of research, education, information, and human resource development for a variety of government and private organizations. It is particularly interested in three areas: energy, health, and environment.

Among ORAU's activities are competitive programs to bring undergraduate and graduate students and faculty members to work on research problems at the research facilities of the Energy Research and Development Administration (ERDA). Participants are selected by ORAU and the staffs of the facilities participating in the ORAU programs, which are Oak Ridge National Laboratory; the Oak Ridge Y-12 Plant; the Oak Ridge Gaseous Diffusion Plant; the Atmospheric Turbulence and Diffusion Laboratory in Oak Ridge; the Savannah River Laboratory and Savannah River Ecology Laboratory in Aiken, S.C.; the Comparative Animal Research Laboratory in Oak Ridge; the Puerto Rico Nuclear Research Center; and the Energy Research Centers in Bartlesville, Okla., Pittsburgh, Pa., and Morgantown. The ORAU Institute for Energy Analysis, the Special Training Division, the Medical and Health Sciences Division, and its other programs also are open to qualified students and faculty members.

Undergraduate Program The ORAU Undergraduate Research Training Program offers juniors majoring in the sciences, engineering, and mathematics an opportunity to spend ten weeks during the summer working in directed research programs at these sites.

Graduate Program. The ORAU Laboratory Graduate Participation Program enables a candidate for an advanced degree, upon completion of all requirements for work-in-residence — except research — to work toward completion of the student's research problem and preparation of the thesis at one of the participating sites.

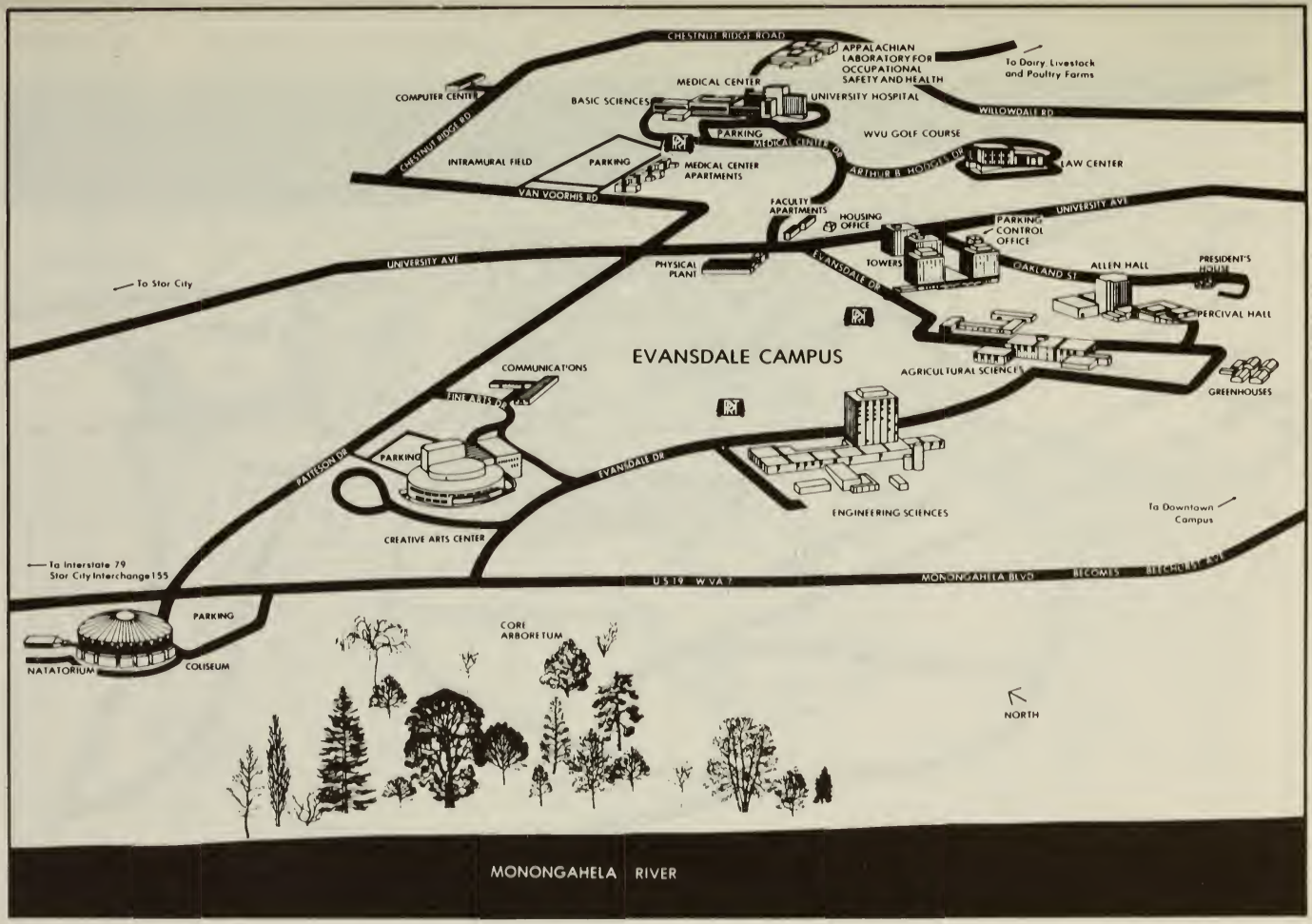
Faculty. Faculty members of WVU, under the ORAU Faculty Research Participation Program, can go to an ERDA facility for varying periods up to

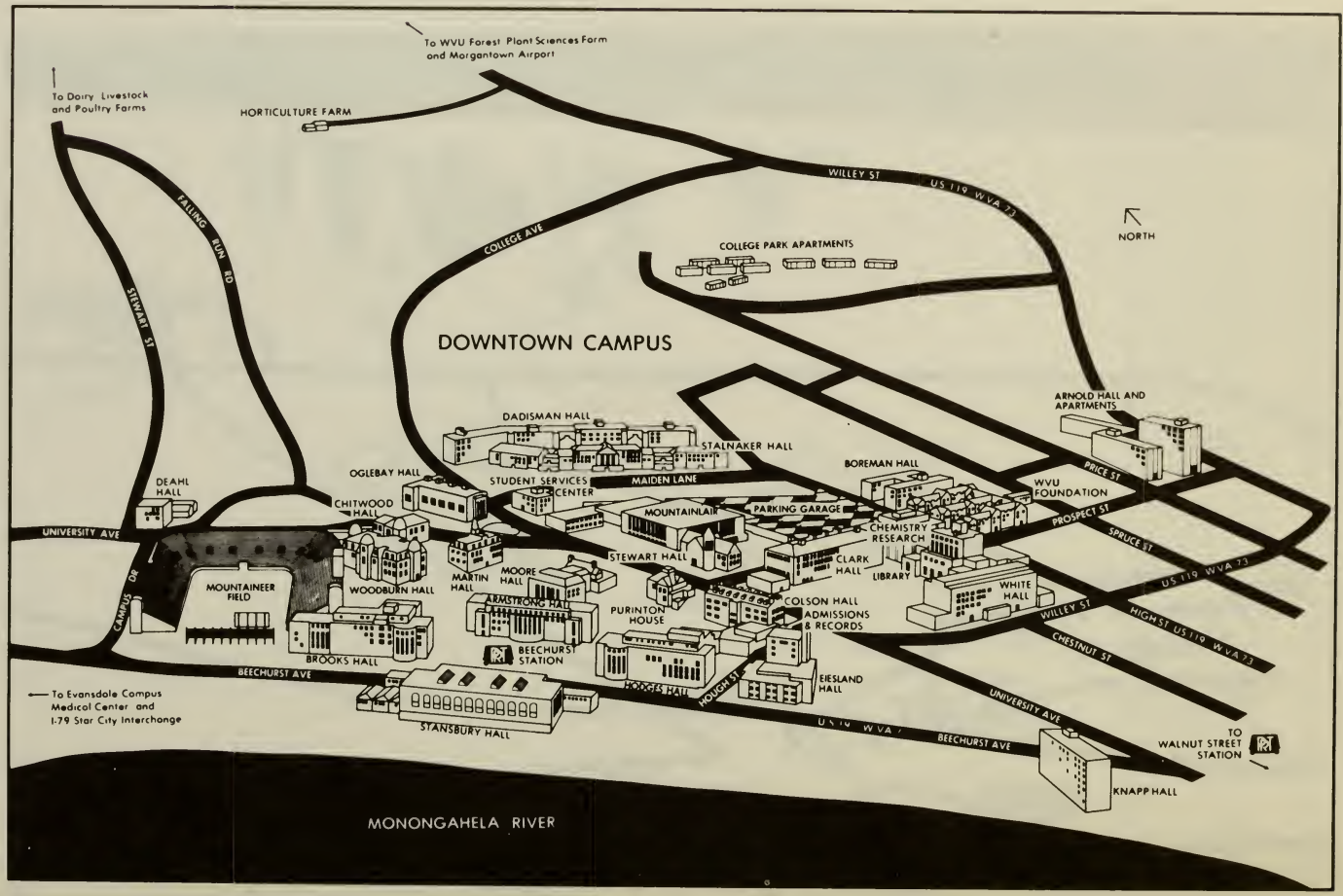
three months, for advanced study and research. It also is possible to combine a sabbatical with a longer appointment.

Stipends. Student stipends are at fixed rates that change from time to time. Faculty stipends are individually negotiated, based upon the current University salary.

A copy of the bulletin and announcement of the ORAU-ERDA university-laboratory programs is available in the WVU Grants and Contracts Office. Bulletins may also be obtained by writing to the University Programs Office, Oak Ridge Associated Universities, Inc., Box 117, Oak Ridge, TN 37830.

Interesed persons should request assistance from Mark H. Conner, grant resources officer (301 Purinton House, 293-2205), who serves as the ORAU Councilor at WVU.


CHESTNUT RIDGE ROAD
APPALACHIAN LABORATORY FOR OCCUPATIONAL SAFETY AND HEALTH
To Dairy Livestock and Poultry Farms
COMPUTER CENTER
MEDICAL CENTER
BASIC SCIENCES
UNIVERSITY HOSPITAL
WILLOWDALE RD
CHESTNUT RIDGE RD
PARKING
WVU GOLF COURSE
INTRAMURAL FIELD
PARKING
MEDICAL CENTER APARTMENTS
MEDICAL CENTER DR
ARTHUR B. HODGES DR
LAW CENTER
VAN VOORHIS RD
FACULTY APARTMENTS
HOUSING OFFICE
UNIVERSITY AVE
PARKING CONTROL OFFICE
To Star City
UNIVERSITY AVE
PHYSICAL PLANT
TOWERS
EVANSDALE DR
OAKLAND ST
ALLEN HALL
PRESIDENT'S HOUSE
PERCIVAL HALL
EVANSDALE CAMPUS
AGRICULTURAL SCIENCES
GREENHOUSES
COMMUNICATIONS
PATTESON DR
PARKING
EVANSDALE DR
ENGINEERING SCIENCES
To Downtown Campus
CREATIVE ARTS CENTER
To Interstate 79
Star City Interchange 155
U.S. 19 W.VA. 7
MONONGAHELA BLVD
BECOMES
PARKING
CORE ARBORETUM
NATATORIUM
COLISEUM
NORTH
MONONGAHELA RIVER


To WVU Forest Plant Sciences Farm and Morgantown Airport
To Dairy Livestock and Poultry Farms
HORTICULTURE FARM
WILLEY ST US 119 WVA 73
NORTH
FALLING RUN RD
STEWART ST
COLLEGE AVE
COLLEGE PARK APARTMENTS
DOWNTOWN CAMPUS
ARNOLD HALL AND APARTMENTS
DADISMAN HALL
STALNAKER HALL
BOREMAN HALL
PRICE ST
WVU FOUNDATION
DEAHL HALL
OGLEBAY HALL
STUDENT SERVICES CENTER
MAIDEN LANE
CHITWOOD HALL
MOUNTAINLAIR
PARKING GARAGE
PROSPECT ST
UNIVERSITY AVE
CHEMISTRY RESEARCH
SPRUCE ST
MARTIN HALL
MOORE HALL
STEWART HALL
CLARK HALL
LIBRARY
WHITE HALL
CAMPUS DR
MOUNTAINEER FIELD
WOODBURN HALL
ARMSTRONG HALL
PURINTON HOUSE
COLSON HALL ADMISSIONS & RECORDS
HIGH ST US 119 WVA 73
BEECHURST STATION
BROOKS HALL
CHESTNUT ST
BEECHURST AVE
HODGES HALL
HOUGH ST
EIESLAND HALL
UNIVERSITY AVE
To Evansdale Campus Medical Center and I-79 Star City Interchange
STANSBURY HALL
US 19 WVA
BEECHURST AVE
TO WALNUT STREET STATION
KNAPP HALL
MONONGAHELA RIVER

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